MCLA

Massachusetts College of Liberal Arts,
375 Church St,
North Adams, MA 01247

Berkshire Environmental Action Team
20 Chapel Street Pittsfield, MA 01201

Re: Partnership Letter

Dear Berkshire Environmental Action Team,

The Massachusetts College of Liberal Arts (MCLA) Public Health and Community Health Education (PHCHE) department is looking forward to partnering with the Berkshire Environmental Action Team on their Air Quality Monitoring for pollutants relating to disparate health outcomes in the city of Pittsfield, Massachusetts.

MCLA is a small public liberal college that that graduates individuals who are practical problem solvers and engaged, resilient global citizens. The mission of the MCLA PHCHE program is to preserve, promote and enhance the health and well-being of human populations through the excellence in education, community-based research, and public service. The program is firmly grounded in a background of science, humanities, social science, and the liberal arts.

We're looking forward to engaging Public Health Education students in crafting and conducting a health survey of residents in the neighborhoods near continuous air monitors that BEAT is planning to deploy in Pittsfield's environmental justice neighborhoods. We plan to gather information from city residents reporting any increases or decreases in existing, or onset of new health conditions throughout the Air Quality Monitoring period. Combined with any additional information we obtain from Pittsfield's Director of Public Health and any local physicians willing and able to supply information on health trends during the testing period, we plan to chronologically compare our data with data from the Air Quality Monitoring project to determine any sign of correlation between increases in pollution and increased health impacts.

We were happy to have BEAT reach out to us with this opportunity for our students to engage in a prolonged real-world project researching health outcomes of their Berkshire County neighbors in Pittsfield. We look forward to this opportunity to partner with you on this impactful opportunity for our community.

Kind Regards

NICOLE PORTHER

OMB Number: 4040-0004
Expiration Date: 12/31/2022

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: 03/25/2022

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Berkshire Environmental Action Team, Inc.

* b. Employer/Taxpayer Identification Number (EIN/TIN): 270054356

* c. Organizational DUNS: 0222940420000

d. Address:

* Street1: Berkshire Environmental Action Team
Street2: 20 Chapel Street
* City: Pittsfield
County/Parish: MA
* State: MA: Massachusetts
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 01201-8502

e. Organizational Unit:

Department Name:

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:
* First Name: Rosemary
Middle Name:
* Last Name: Wessel
Suffix:

Title: Program Director

Organizational Affiliation: Berkshire Environmental Action Team

* Telephone Number: 4133587663
Fax Number:

* Email: rose@thebeatnews.org

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

M: Nonprofit with 501C3 IRS Status (Other than Institution of Higher Education)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:

66.034

CFDA Title:

Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities Relating to the Clean Air Act

*** 12. Funding Opportunity Number:**

EPA-OAR-OAQPS-22-01

* Title:

Enhanced Air Quality Monitoring for Communities

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

1257-Pittsfield Map & Facts Sheet.pdf | Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Air Quality Monitoring for pollutants relating to disparate health outcomes in the city of Pittsfield, Massachusetts

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: MA-001 * b. Program/Project: MA-001

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 11/01/2022 * b. End Date: 10/31/2025

18. Estimated Funding ($):

* a. Federal	300,131.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	18,703.00
* f. Program Income	0.00
* g. TOTAL	318,834.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name: Rosemary

Middle Name:

* Last Name: Wessel

Suffix:

* Title: Program Director

* Telephone Number: 413-358-7663 Fax Number:

* Email: rose@thebeatnews.org

* Signature of Authorized Representative: Rosemary Wessel * Date Signed: 03/25/2022

QUOTE

office 1 866 925 7737
email sales@spectotechnology.com
web www.spectotechnology.com

Quote Number: SQ-35041 **Quote Date:** 03/15/2022
Quote Reference: Aeroqual Outdoor Air Quality Starter Kits x5
Customer Contact: Rosemary Wessel, 413-464-9402
Payment Terms: Pre Pay

Billing Address	Shipping Address
Berkshire Environmental Action Team 20 Chapel St. Pittsfield MA 01201 United States	Berkshire Environmental Action Team 20 Chapel St. Pittsfield MA 01201 United States Att: Rosemary Wessel

#	Code	Product Description	Unit	Qty.	Unit Price	Total Price
1	AQ-HH-START	Outdoor Air Quality Test Kit (Starter). *Includes:* *Series 500 Monitor base including: LCD digital display, Lithium battery and charger, in-built datalogger, monitor to USB cable, PC software.* *Particulate Matter Sensor PM10 / PM2.5* *Ozone Sensor 0-0.15ppm* *Nitrogen Dioxide Sensor 0-1ppm* *Temperature & Humidity Sensor* *Small Carry Case*	each	5.0	$2650.00	$13,250.00

#	Additional Items	Qty.	Unit Price	Total Price
1	Shipping - UPS Ground *- price TBD*	1	$0.00	$0.00

*** Unless specified, shipping will be on Specto's account and cost will be calculated and applied at the time of dispatch ***

Total (pre-tax)	$13,250.00
Sales Tax (MA)	$828.13
Grand Total	**$14,078.13**

Notes:
12 month warranty on all items
We provide annual factory sensor head calibrations with certificate for $200 per sensor head in NJ, USA (bulk discount available).

NEW CUSTOMERS:
(1.) Prepayment is required by check, wire, or credit card.
(2.) Upon completion of our credit application, customer will be granted net-30 terms on future orders.

EMPLOYEE HANDBOOK

Revised 2021

INTRODUCTION/ ABOUT THIS HANDBOOK

This handbook was originally drafted in 2007 when BEAT was a very small organization. Future revisions and approval should include input and feedback from other environmental organizations, staff and Board members, as well as a legal review.

These policies are not set in stone. They are expected to change as business conditions and laws change. The policies, briefly summarized here, represent only guides for the employee and organization in our relationships and do not establish any contractual rights on either employer or employee. BEAT retains the right to revise, change, suspend or cancel in whole or in part any of the policies in this handbook at any time without notice. BEAT also reserves the right not to apply any particular policy in a given situation.

Going forward, BEAT hopes to maintain this document as a relevant useful tool for all members of the organization. Any questions about its content, or suggestions and requests for changes, should be made in writing to the Executive Director.

WHO WE ARE AND WHAT WE DO

Berkshire Environmental Action Team, formed in 2001, when a group of environmentally concerned people came together to try to protect the environment for wildlife in the Berkshires and beyond. BEAT officially incorporated on August 15, 2003 and received non-profit status on September 17, 2003. BEAT is a not-for-profit, 501(c)3 corporation committed to working with citizens to protect the environment for wildlife.

EMPLOYMENT POLICIES

BEAT has developed employment policies in an effort to clarify and standardize the working environment. By existing in writing, it generally outlines to each and every employee what is expected and what is available. In the event any of the following employment policies are abused or violated, management will take prompt and appropriate disciplinary action. Disciplinary action can range from formal discussion with the employee about the matter to immediate discharge.

OUR RELATIONSHIP

BEAT is still a small organization. Your presence here as part of the staff is critical to the smooth and successful running of the office. As a whole organization and as individuals, BEAT values your participation in all aspects of BEAT and hope to make your tenure here long lasting and pleasant. With that in mind, the policies outlined here are to clarify what you can expect from your employment at BEAT.

Your employment with Berkshire Environmental Action Team is voluntarily entered into and you are free to resign at any time. Similarly, BEAT is free to terminate an employment relationship at any time when BEAT believes it is in its best interest. While BEAT hopes the relationship will be long and mutually beneficial, it should be recognized that neither you nor BEAT have entered into any contract of employment, express or implied. Our relationship is one of voluntary employment "at will". Employment can be terminated, with or without cause, and with or without notice, at any time, at the option of either BEAT or the employee.

Anti-HARASSMENT

Attached to this Handbook is the Anti-Harassment Policy of BEAT. The policy outlines the procedures for defining and following up on any complaints received.

DRUGS/ALCOHOL USE

Under no circumstances are illegal drugs allowed on the premises or by use, distribution, or sale by employees on the job. Also, employees are not to report to work impaired by either alcohol or drugs. Smoking is not permitted in the office. Smoking is not permitted while representing BEAT – this includes in the field when working for BEAT, or anywhere if you are representing BEAT.

CONFLICT OF INTEREST

Although BEAT employees are generally free to engage in personal financial and business transactions, this freedom is not unlimited. You have a duty to avoid situations where your loyalty may be divided by BEAT's interests and your own interests. All employees should avoid the appearance of impropriety. While it is not possible to list all situations that are unacceptable conflicts, some typical situations follow:

1. Employees should not accept a position with any other company or other professional engagement if the time demands impair the employee's obligations to BEAT.

2. Employees agree not to engage in any activity in direct competition with BEAT.

3. Employees should not use the BEAT name in an attempt to seek personal favors, price considerations, or concessions from anyone.

4. Employees should not use BEAT as a threat or as a means of harassment to obtain personal or private consideration.

5. Employees should not serve as voting directors on outside boards of directors where BEAT's position may be enhanced without full disclosure of the potential conflict of interest.

6. Employees should not discuss BEAT business such as details of lawsuits, mediation, or land transactions with others unless information has been the subject of full public disclosure. At no time should donor records be disclosed to anyone outside of BEAT.

PERSONNEL FILES

The file record of your employment is the property of BEAT; however, you may ask to review your file at any time. Files will include at minimum: tax forms and I-9 forms completed at your hiring, job description and any other documents that set forth the terms of your hire, final copies of any written performance reviews, and discipline (if any). Employees will be provided an opportunity to review his or her personnel file during normal work hours upon request. Employees may also obtain a copy of his or her personnel file within five business days of a written request.

PERSONAL CONDUCT/ OFFICE POLICY

It is expected that each of you will treat our members, our associates, fellow staff members, and Board of Directors with the utmost courtesy, professionalism, and fairness at all times.

Employees who use their cars for BEAT business will have auto insurance with the legally required liability limits as set by the State of Massachusetts.

EMPLOYMENT AND PERSONNEL INFORMATION

ANTI-DISCRIMINATION POLICY

BEAT actively works to prevent discrimination. We are an equal opportunity employer, and hires personnel without regard to age, ethnicity, gender, gender preference, national origin, disability, race, color, veteran status, marital status, size, religion, sexual orientation, LGBTQ+ status, socioeconomic background, or any other characteristic protected by law.

This policy also applies to internal promotions, training, opportunities for advancement, terminations, selection of Board members, relationships with outside vendors and customers, use of contractors and consultants, and in dealing with the general public.

Violations of this policy will be dealt with quickly, and disciplinary action may be taken, up to and including termination. If you believe that you have been discriminated against, report the incident immediately to your supervisor or a member of the Board of Directors.

HIRING POLICY

As part of the hiring process, BEAT will ask the new employee to complete State and Federal withholding forms, an Immigration Status form (I-9), and information about potential benefits available.

The direct supervisor is responsible for assuring that the new employee has a complete orientation to the specific tasks of the job, to the mission and goals of BEAT, and to the systems and equipment within the office

REVIEWS

New hires will meet with their supervisor after three months to assess whether initial expectations have been met on both sides, to evaluate if there is a good "fit", and to make any initial adjustments if necessary to ensure continued satisfaction in the first year.

Each employee's performance will be reviewed annually, identifying skills and strengths, past performance, as well as results expected for improvement. Supervisors are encouraged to seek out feedback from other staff in the development of this appraisal.

COMPENSATION

BEAT has no set office hours and work time is very flexible. All staff are expected to keep a record of their hours worked. Part-time employees' hours are set to meet the needs of BEAT and the employee, and may vary from year to year, or within a fiscal year. A schedule will be mutually arranged.

If an employee is ill or not able to make it to work, a call to their supervisor is expected in a timely manner.

All employees are paid monthly.

YOUR SALARY

BEAT strives to pay generally competitive salaries, necessarily subject to budget limitations. At your hiring, it should be made clear what your complete compensation package will be for the first year of employment.

Your compensation package should be reviewed each year within a month of your anniversary date. Salary adjustments, if any, may be based on a plan in which BEAT uses the following factors:

1. Your performance and accomplishment of goals.

2. A salary survey of your position among land trusts and other environmental organizations.
3. Your length of service.
4. The general cost of living and/or average increase in Massachusetts.
5. BEAT's ability to pay as determined by the budget.

Salary adjustments, if any, are made at the discretion of the Executive Director.

BENEFITS

Mandatory

Berkshire Environmental Action Team Inc. abides by all relevant federal and Massachusetts employment laws. This includes contributing in matching amounts to employee's Social Security Account (both FICA and Medicare), and making required payments to state and federal unemployment insurance programs (SIT and FUTA). BEAT is also bound to pay for current workers' compensation insurance for all employees. Copies of the policies can be obtained by speaking with the Director. As of 2020, BEAT pays for employees' share of the Family and Medical Leave payroll withholding.

Flex Time and Vacation

BEAT allows a very flexible schedule and you are able to work from home when mutually beneficial.

After one year of employment, BEAT offers three one weeks paid time off, with the number of hours being the average number of hours worked per week the preceding year.

Health Insurance

BEAT encourages all staff to be covered by health insurance. BEAT is looking for an affordable health insurance plan.

Retirement Benefits: 403(b) Program

BEAT does not currently offer a retirement plan.

Professional Development

BEAT staff members are encouraged to take courses and engage in professional and community activities that enhance their effectiveness in their current jobs as well as their potential to take on new responsibilities within BEAT. BEAT will endeavor to assist financially any employee's attendance at relevant conferences or trainings.

LEAVES OF ABSENCE

Bereavement Allowance

When a death occurs in your family, BEAT will provide time off. You determine how much time off you need in discussion with your supervisor.

Personal Leave

BEAT may provide leave without pay. An employee ask for Leave of up to four weeks unpaid leave as far in advance as possible. Final approval rests with the Executive Director.

DISMISSAL/SEPARATION

Employees who voluntarily resign are encouraged to give at least two weeks notice. Employees in director positions are encouraged to give four weeks' notice.

At the time of separation, every attempt will be made to hold an exit interview between the departing employee so that the reasons for leaving are documented and discussed. Written follow-up of the contents and issues raised at the exit interview will be up to the discretion of the Board in conjunction with the Executive Director.

Departing employees are required to return all BEAT property including office keys and to furnish an address for IRS W-2 mailing.

MISCELLANEOUS

GRIEVANCE PROCEDURES

BEAT is a small office and BEAT staff benefit from honest, open and constructive feedback. Your job satisfaction is important to BEAT. If you have problems or concerns, BEAT encourages you to deal with them promptly. BEAT is committed to having an environment in which it is safe to be honest with feedback. BEAT encourages staff to talk directly to the person most involved, in an effort to solve the concern. If this does not resolve any problems, it is important that you bring it to the Executive Director's attention immediately. If this is inappropriate or the response is unsatisfactory, going to a member of the Board is the next step. See the process outlined in the Sexual Harassment Policy under the appendices for further definition. In order for the organization to best handle any grievance, these are confidential matters, and should only

be shared with those directly concerned. BEAT expects professional behavior in dealing with any grievance, in order for a positive resolution.

SPEAKING WITH THE PRESS

BEAT will provide training on speaking with the public about BEAT. All of us have an important part in sharing our enthusiasm for BEAT with the community.

BEAT is an organization to which many confidential matters are entrusted. Each of us has a responsibility to maintain confidences and to treat all confidential information in a confidential manner. This may include rare species information, land conservation plans, and donor information.

WORKPLACE INJURIES

Worker's Compensation

BEAT carries worker's compensation insurance for all employees in accordance with state law. Attached and posted in the main BEAT office is a copy of the Notice to Employees stating the particulars of this policy.

It is important that any injury, however slight, incurred while on the job be reported immediately to the supervisor and the Executive Director. Appropriate forms must be completed, for otherwise the employee could be precluded from receiving worker's compensation benefits pertaining to the injury.

REIMBURSABLE EXPENSES

Mileage for trips to meetings and general office errands is currently reimbursable at the Federal Mileage Rate per mile. All expenses must be pre-approved. BEAT does not commit to paying any expenses that were made without formal approval. All reimbursement requests must be in writing with appropriate receipts and your signature. BEAT cannot reimburse for commuting mileage.

BEAT's Anti-Harassment Policy

Introduction

It is BEAT's goal to promote an environment that is professional and that treats all those who work or volunteer for BEAT with dignity and respect. While this policy was developed specifically to address sexual harassment, no type of harassment will be tolerated. This is any form of behavior that is uninvited or unwelcome, is likely to cause a hostile or uncomfortable environment by humiliating someone, seriously embarrassing them, offending them or intimidating them; and may cause offence. This includes harassment based on race, creed, color, religion, national origin, ancestry, gender, sexual orientation, gender identity or expression, age, physical or mental handicap, veteran status, marital status, or socio-economic status.

Sexual harassment is unlawful* and no form of harassment will be tolerated. Further, any retaliation against an individual who has complained about harassment or retaliation against an individual for cooperating with an investigation of a harassment complaint will also not be tolerated.

Because BEAT takes allegations of harassment seriously, we will respond promptly to complaints of harassment, and where it is demonstrated to our satisfaction that such harassment occurred, we will act promptly to eliminate the harassment and impose such corrective action as is necessary, including disciplinary action where appropriate.

Definition of sexual harassment

Sexual harassment is generally defined as follows: sexual advances, requests for sexual favors, and verbal, nonverbal or physical conduct of a sexual nature when either (a) submission to or rejection of such advances, requests, or conduct is made either explicitly or implicitly a term or condition of employment or as a basis for employment decisions; or (b) such advances, requests or conduct have the purpose or effect of unreasonably interfering with an individual's work performance by creating an intimidating, hostile, humiliating or sexually offensive work environment. Sexual harassment is sexually oriented conduct, whether it is intended or not, that is unwelcome and has the effect of creating a workplace environment that is hostile, offensive, intimidating, or humiliating to male or female workers regardless of sexual orientation. The following are some examples of behavior that is

prohibited and may be considered sexual harassment: (i) unwelcome sexual advances, whether they involve physical touching or not, (ii) unwelcome touching, (iii) requests for sexual favors in exchange for actual or promised job benefits, (iv) assault or coerced sexual acts, or (v) sexual remarks, display of sexual material and sexual gestures.

* Massachusetts General Laws, Chapter 151B and 1996 Acts and Resolves, Chapter 278.

Internal Procedures

Employees or volunteers who feel that they have been subjected to harassment may file a complaint with the Executive Director or a member of the Board of Directors. This may be done in writing or orally. All complaints will be investigated in a fair and expeditious manner. The investigation would include a private interview with the person filing the complaint. We may also interview the person alleged to have committed harassment as well as any witnesses.

If our investigation reveals that behavior prohibited by this policy did occur, we will act promptly to eliminate the offending conduct, and where it is appropriate, we will also impose disciplinary action. Such actions may include counseling, informal or formal reprimands, and/or written sanctions, including termination from employment. When we have completed our investigation, we will inform the person filing the complaint of the completion of the matter.

External Procedures for sexual harassment

In addition to the above, employees who believe that they have been subjected to sexual harassment may file a formal complaint with the United States Equal Employment Opportunity Commission and the Massachusetts counterpart, whose addresses are set forth below. These agencies will prepare and investigate complaints of sexual harassment and may take appropriate action.

a. The United States Equal Employment Opportunity Commission ("EEOC"),
1 Congress Street–10thFloor Boston, MA 02114 (617) 565-3200
How to file a complaint: https://www.eeoc.gov/employees/charge.cfm

b. The Massachusetts Commission against Discrimination ("MCAD")
Boston Office: One Ashburton Place – Rm 601, Boston, MA 02108 (617) 727-3990
Springfield Office: 424 Dwight Street, Rm 220 Springfield, MA 01103 (413) 739-2145
How to file a complaint webpage: http://www.mass.gov/mcad/filing-complaint/

Revised 6/9/2017

Clarity Movement Co.
808 Gilman Street
Berkeley, CA 94710

Estimate

ADDRESS
Berkshire Environmental Action Team (BEAT)

SHIP TO
Pittsfield, MA

ESTIMATE # 1845
DATE 03/14/2022

ACTIVITY	QTY	RATE	AMOUNT
Clarity Node-S Non-inventory Clarity Node-S with PM2.5, NO2, Temperature, and Relative Humidity; Solar Panel + Battery; Cellular Communication	10	0.00	0.00
Clarity Data License Service Subscription Per Node (x3 years) including Clarity hardware, Clarity Dashboard, APIs, and Clarity air quality expert support service	10	3,600.00	36,000.00
Service Discount Service Discount (20%)	10	-720.00	-7,200.00

Written acceptance or submitted purchase order of this estimate incorporates by reference acceptance of the attached Terms of Use and Service agreement. If you take exception to any terms, please email admin@clarity.io.

The customer may be required to remit sales tax even if Clarity does not collect it.

SUBTOTAL	28,800.00
TAX	0.00
SHIPPING	920.66
TOTAL	**USD 29,720.66**

Accepted By

Accepted Date

INTERNAL REVENUE SERVICE
P. O. BOX 2508
CINCINNATI, OH 45201

DEPARTMENT OF THE TREASURY

Date: APR 10 2008

Employer Identification Number:
27-0054356
DLN:
17053075740078
Contact Person:
STEVE D DUVALL ID# 31535
Contact Telephone Number:
(877) 829-5500
Public Charity Status:
170(b)(1)(A)(vi)

BERKSHIRE ENVIRONMENTAL ACTION TEAM
27 HIGHLAND AVE
PITTSFIELD, MA 01201-2413

Dear Applicant:

Our letter dated December 2004, stated you would be exempt from Federal income tax under section 501(c)(3) of the Internal Revenue Code, and you would be treated as a public charity, rather than as a private foundation, during an advance ruling period.

Based on the information you submitted, you are classified as a public charity under the Code section listed in the heading of this letter. Since your exempt status was not under consideration, you continue to be classified as an organization exempt from Federal income tax under section 501(c)(3) of the Code.

Publication 557, Tax-Exempt Status for Your Organization, provides detailed information about your rights and responsibilities as an exempt organization. You may request a copy by calling the toll-free number for forms, (800) 829-3676. Information is also available on our Internet Web Site at www.irs.gov.

If you have general questions about exempt organizations, please call our toll-free number shown in the heading.

Please keep this letter in your permanent records.

Sincerely yours,

Robert Choi
Director, Exempt Organizations
Rulings and Agreements

Letter 1050 (DO/CG)

Jane B. W. Winn

Ex. 6 Personal Privacy (PP)

Work Experience:

Berkshire Environmental Action Team, Inc. - Executive Director and one of the founders
2002 to present. Website: www.thebeatnews.org

- Supervise staff and volunteers, fundraise, manage the organization, work with the Board to set priorities and develop strategies to protect the environment for wildlife.

Berkshire Conservation Collaborative – Coordinator - 2005 to 2009

- The Collaborative is a loose network of conservation minded organizations and individuals working together to increase communication among our groups and to increase our voice at the state capital.

4Winns Productions – Partner - January 2001 to December 2011

- film, edit, and produce educational, scientific, historic, and underwater films for DVD, video, and television – including: Atlantic Salmon Egg Rearing Program at the Becket-Washington Elementary School, The Water Cycle, Watershed Protection, Onota Lake Water Quality Monitoring and Weed Management
- National Award winning – Lake Mansfield Watershed Study 2002-2003 won the National Garden Clubs Inc. Video/CD Award

The Nature of Things Science and Nature Store – Partner/Owner - May 1989 to February 1996

- started, owned, and operated a retail Science and Nature Store in Lenox, MA
- set up the inventory and accounting systems, and trained all the staff

Franklin County Mental Health Association
- February 1986 to July 1989

- learned non-profit accounting on the job as I moved up from bookkeeping clerk to accounting supervisor at a time when the facility was moving to computerized accounting systems
- developed the spreadsheets for the financial reporting to the Departments of Mental Health and Social Services

Educational History:

Additional course work in Wetland Science and Geographic Information Systems

University of Massachusetts, Amherst - 1979 to 1982
Master of Science – Zoology
Teaching Associate – laboratory sections of Introduction to Zoology for Majors, Anatomy and Physiology for nursing students, and Comparative Anatomy

Quinnipiac University – 1975 to 1979
Bachelor of Arts – Biology

Relevant Volunteer Activities:

Last Word Toastmasters Club of Toastmasters International – 2006 to 2010
Served as Sergeant at Arms, Vice President Membership, and Vice President Education

Housatonic River Initiative – 2004 to present
Board of Directors

Housatonic Valley Association - 2002 to 2008
Water quality monitor once per month on the West Branch of the Housatonic River

Lake Onota Preservation Association – 2000 to present
Currently – data entry and production of data sheets and graphs for the annual report.
2000 to 2003 – Researched and mapped tributaries and storm drains, developed and implemented water quality monitoring program for the tributaries. Occasionally assisted with in-lake water quality monitoring.

Dalton Community Cable Association – 1999 to 2004
Film, edit, and produce television shows. Teach community members to do the same. Tax preparation 1999-2003.

Mass Audubon – 1997 to 2004
Board of Directors – served three years as an associate board member. In 2000 was elected to the full board and served on the Education, Advocacy and Conservation committees.

Berkshire Natural Resource Council – summer 2002
An experienced volunteer and I inspected boundaries of some of the many conservation restrictions held by the organization for violations.

Pittsfield Community Television – 1998 to 1999
Film, edit, and produce television shows for Berkshire Wildlife Sanctuaries of Mass Audubon.

Berkshire Sanctuaries of Mass Audubon – 1991 to 1998
Advisory Board member including two years as Vise Chairperson and two years as Chairperson.

Rosemary Wessel

Ex. 6 Personal Privacy (PP)

~ EXPERIENCE

February 2014 - Present

Program Director, Fossil Fuel Watchdogging, ***Berkshire Environmental Action Team***
Pittsfield, Massachusetts

Our mission is to work to prevent and mitigate the impacts of climate change by halting the expansion of fossil fuel infrastructure in the Northeast and to promote energy efficiency and sustainable, renewable sources of energy and local, permanent jobs in a clean energy economy. We also monitor and inform on other gas pipeline and energy related news and help other communities who are facing similar environmental health and climate threats from similar projects. Work includes community education and coalition-building, instruction on participation in regulatory and legislative process to affect positive change and tying individuals in to a broad network of grassroots organizations. Management of staff and volunteers.

June 2016 - Present

Clean Energy Coordinator, ***The Old Stone Mill Center Zero Waste Maker Space***
Adams, Massachusetts

Developer of a Clean Energy plan and broker for experiments in new clean energy technologies at The Old Stone Mill Center. The OSMC is a developing community center and Zero Waste Maker Space set in a historic mill building, with a commitment to never use fossil fuel based energy sources in its operation. Incremental development of specific use zones during the building's deep retrofit allows us to try out different forms of heating and cooling technologies. We are currently exploring a first of its kind non-combustion / non-gasification compost heat exchange system.

September 2006 - Present

Owner/Designer, ***Three Salamanders Design Studio***
Cummington, Massachusetts

Sole proprietor design service. Specialties include publication and direct mail design, signage and vehicle graphics, product labels, logo and image development, website design with social media outreach, promotional photography and video production. Consultation offered in development of online presence, software use training and IT troubleshooting for small businesses and individuals.

August 2006 - September 2008

Instructor, Graphic Design, ***Mildred Elley Technical College***
Pittsfield, Massachusetts

Sole instructor for graphic design and administrative assistant departments. Curriculum development and instruction in design basics, studio arts, video and audio production, art and media history, marketing theory and design practice business management skills, computer use,

basic internet skills and typing. Specific software training in: Adobe Photoshop, Illustrator, InDesign, Dreamweaver, Flash animation; iMovie, Garage Band; Microsoft Word, Excel and Publisher.

~ SKILLS

Community organizing - Gathering community input, guiding group brainstorming and decision making, connecting stakeholder groups, establishing ongoing channels of communication, building coalitions of diverse groups of stakeholders - community organizations, elected leaders, regulatory agencies

Research - Research into technical and regulatory details of energy system infrastructures and their environmental, social and climate impacts.

Program Management - Researching, building and executing campaigns. Design and execution of public education and media outreach. Pulling together support from public, local, state and federal elected officials and offices. Outreach to private sector stakeholders. Management of staff and volunteers.

Public speaking - Presentations, technical lectures, community education and workshops, media outreach, media program interviews

Online communications - Building websites and social media campaigns, making promotional videos, scheduling and running online presentations through Zoom, sharing online events with local television stations and on multiple online formats like YouTube and Vimeo

~ EDUCATION

January 1993 - May 1995

M.S. Design - Architectural Studies, ***UMass Amherst, Amherst, MA***

Specialized in energy efficient and sustainably sourced building design for residential and commercial architecture. Thesis focused on net-zero retrofit of existing mill building for community center for underserved, post-industrial region in southern New Hampshire.

September 1983 - December 1987

B.A. Fine Art - Drawing & Painting, ***Castleton State College, Castleton,VT***

Intensive studio art instruction in painting, drawing, printmaking and sculpture, color theory, and art history. Basic core educational classes with additional coursework in Spanish language, cultural geography, music theory and practice, video production and writing for TV and radio.

BERKSHIRE ENVIRONMENTAL ACTION TEAM
20 Chapel St. Pittsfield, MA 01201 • thebeatnews.org
413-464-9402 • team@thebeatnews.org

Protecting the environment for wildlife in support of the natural world that sustains us all.

Background

Berkshire Environmental Action Team (BEAT) is a non-profit organization with a mission to protect the environment for wildlife in support of the natural world that sustains us all. We take on a broad scope of work to achieve our ambitious goals. Some of our current projects include actively sampling stormwater pipes for *E. coli* to eliminate pollution in our rivers, performing stream continuity surveys to improve aquatic connectivity, challenging peaking power and biomass plants to reduce air pollution, assisting in the implementation of composting and zero waste initiatives throughout the county, and more! BEAT is an equal opportunity organization. We work closely with all types of people and we stand against all forms of discrimination including those based upon age, ethnicity, gender, national origin, disability, race, color, veteran status, marital status, size, religion, sexual orientation, LGBTQ+ status, socioeconomic background, or system of belief.

Pittsfield Air Quality Monitoring Project

Using ten stationary continuous air monitors and five mobile monitors, BEAT will be monitoring for PM2.5, PM10 and NO2 throughout key locations in Pittsfield, Massachusetts, including environmental justice neighborhoods, city schools, near point sources of pollution and in "control" locations away from these centers. We will compile neighborhood-level air quality data to compare with location and weather data. We will also conduct a public health survey in which community members note any existing or new health concerns and increases and decreases in severity, chronologically pairing this data with air quality monitoring results to look for any correlation. This data will be shared with local, regional and state agencies as well as environmental and community action organizations to advocate for changes in policy to lower environmental pollution with the goal of addressing climate impacts and public health, especially in vulnerable environmental justice neighborhoods.

Air Quality Mobile Monitoring Program Staff

BEAT is seeking four air quality associates to assist with sampling air quality at a range of locations in Pittsfield using AeroQual hand-held mobile monitors. Mobile Monitor staff will coordinate with the Project Manager to determine the location and timing of air quality sampling to take place in Pittsfield on any given day. Sampling at different times of day, in different weather conditions through all four seasons will be required. Air quality associates will attend community events to demonstrate sampling the sampling process and real time results.

Required Qualifications

- Ability to be out in all forms of weather (all except hazardous weather)
- Ability to travel to sampling sites in Pittsfield neighborhoods
- Passion for protecting the environment
- Ability to adhere to a strict protocol
- Good interpersonal skills especially in situations where you may have to interact with a diverse array of community members
- Proficiency with computers and ability to learn Aeroqual data handling software

Preferred Qualifications

- Familiarity with air quality monitoring or similar mobile environmental monitoring equipment is a strong plus
- Familiarity with data analysis software is a strong plus

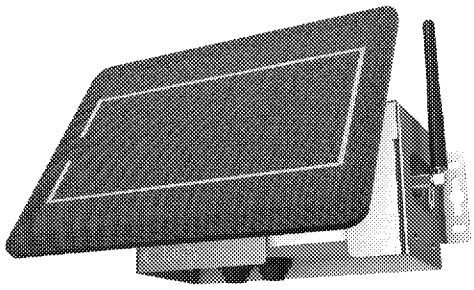
This is a part-time position $17.50/hr., about 20 hrs./month average for roughly 2.75 years during the 2023 - 2025 timeline of our Pittsfield Air Quality Monitoring project. Training will be provided.

Pittsfield residents, especially residents of Westside and Morningside neighborhoods are strongly encouraged to apply.

Please send a resume, cover letter, and three professional references to team@thebeatnews.org to apply.

clarity

Node-S Technical Specifications



AIR QUALITY MEASUREMENTS

PARAMETER	TECHNOLOGY	RANGE	PERFORMANCE AFTER CALIBRATION
Particulate Matter $PM_{2.5}$ [µg/m³]	Laser Light Scattering with Remote Calibration	0-1000 µg/m³ 1 µg/m³ resolution	Accuracy: < 100 µg/m³: ± 10 µg/m³; ≥ 100 µg/m³: within ± 10% of measured value Correlation (R^2) with USEPA FEM instrument > 0.8
Nitrogen Dioxide NO_2 [ppb]	Electrochemical Cell with Remote Calibration	0-3000 ppb 1 ppb resolution	Accuracy: < 200 ppb: ± 30 ppb; ≥ 200 ppb: ± 15% of measured value Correlation (R^2) with USEPA FEM instrument > 0.7

Additional Node-S Parameters: $PM_{2.5}$ Number Concentration [#/cm³] | PM_1 Mass Concentration [µg/m³] | PM_1 Number Concentration [#/cm³] PM_{10} Mass Concentration [µg/m³] | PM_{10} Number Concentration [#/cm³] | Internal Temperature [°C] | Internal Relative Humidity [%]

Additional Parameters with Add-On Modules: Wind Speed | Wind Direction | Ambient Temperature | Ambient Relative Humidity Atmospheric Pressure | FEM-Grade Ozone Concentration | tVOC Concentration

DATA FLOW

Measurement Frequency (Adjustable)	Default: Once every 15 minutes Minimum: Once every 3 minutes
Data Retrieval from Cloud	Clarity Dashboard (Web App) RESTful APIs (Programmatic Access) OpenMap (Public Data Sharing)
Device to Cloud Communication	Global cellular 2G/ 3G/ 4G SIM card and service included

POWER[1]

Current Consumption	28 mA (sensing) 30 mA (transmission) <300 uA (sleeping)
Input Voltage	15 V
Battery Capacity	6400 mAh capacity 10.8 V nominal voltage 5 hours charge time
Solar Panel	6 W (max power) 21.6 V (open circuit voltage) 350 mA (short circuit current)
Battery Life[2]	30 days (without solar power harvesting) >5 years (with solar power harvesting)[3]

OPERATING CONDITIONS

Weatherproof Rating	IPX3
Operating temperature[4]	-10° to 55° C
Absolute temperature rating	-40° to 70° C
Operating humidity	10% to 98% RH
UV Exposure	UV resistant

DIMENSIONS

Node (without shield or solar panel)	165 mm (W) x 84 mm (H) x 80 mm (D) Weight: 2.00 lb / 0.91 kg
Solar Panel	233 mm (W) x 176 mm (H) x 4 mm (D) Weight: 1.03 lb / 0.47 kg
Solar Shield[4]	195 mm (W) x 97 mm (H) x 94 mm (D) Weight: 0.60 lb / 0.27 kg
Weight	Total assembled: 3.64 lb / 1.65 kg

[1] The Node-S can be used as a solar-powered or externally-powered device. External power required for operation below 0° C.
[2] Varies by deployment site location, solar panel orientation, and sampling frequency.
[3] Assuming default measurement frequency and exposure to an average of one hour of full sunlight per day over a 5 days rolling window.
[4] Solar shield provides protection against direct heat radiation.

SPECTO

aeroqual

Portable Air Quality Monitors

Portable air quality monitors

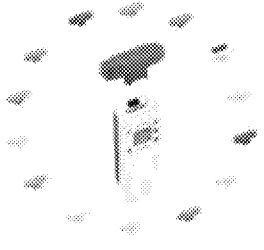
Aeroqual's portable air quality monitors are tools for air quality professionals and enthusiasts alike to gather real-time information on the surrounding air. They are a flexible air quality monitoring solution that can be configured with 27 different gas sensors and particle sensor for a range of uses from environmental monitoring to industrial applications.

What can it measure?

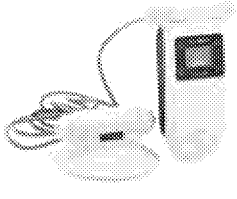
- Criteria pollutants (WHO, EPA, EU)
- Indoor pollutants
- Industrial gases
- Particulate matter (PM_{10}, $PM_{2.5}$)
- Temperature and Relative Humidity

What can it be used for?

- Short term air quality studies
- Checks on pollution "hot spots"
- Site air quality surveys
- Personal exposure assessments
- Short term fixed monitoring

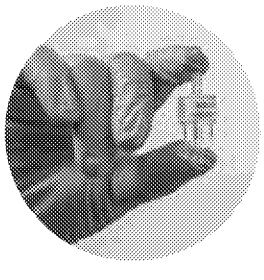


28 inter-changeable sensors

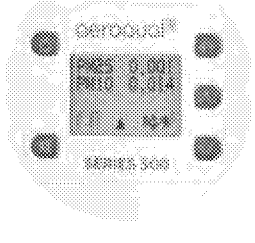


Customizable to a variety of applications

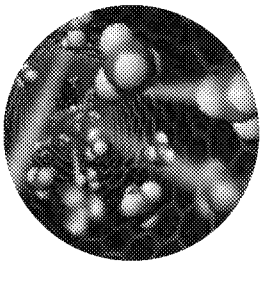
Designed for outdoor performance



GSS technology for ppb level measurements



Real-time data capture



Part-per-billion gas detection in ambient air

Traceable factory and field calibration

US EPA Highlighted

In the EPA 2014 Air Sensor Guidebook featuring low cost air sensors, Aeroqual's Series 500 was highlighted for our ozone, nitrogen dioxide, and carbon monoxide sensors.

ED_013931A_00000938-00002

Easy as 1-2-3

Our portable air monitors are designed to make ambient air quality monitoring easy as 1-2-3. They are used by researchers, professionals, and non-experts alike to gather indicative air quality data. Small enough to fit comfortably in the hand, they can be used anywhere – indoors or outdoors, on the street, up a mountain, they've even been used in Antarctica!

Step 1

Gather data

Use the monitor and inter-changeable sensors to take spot measurements, or log data over time and space.

Step 2

Download data

Connect to a PC and download your measurements using Aeroqual's free software or 0-5V analog output.

Step 3

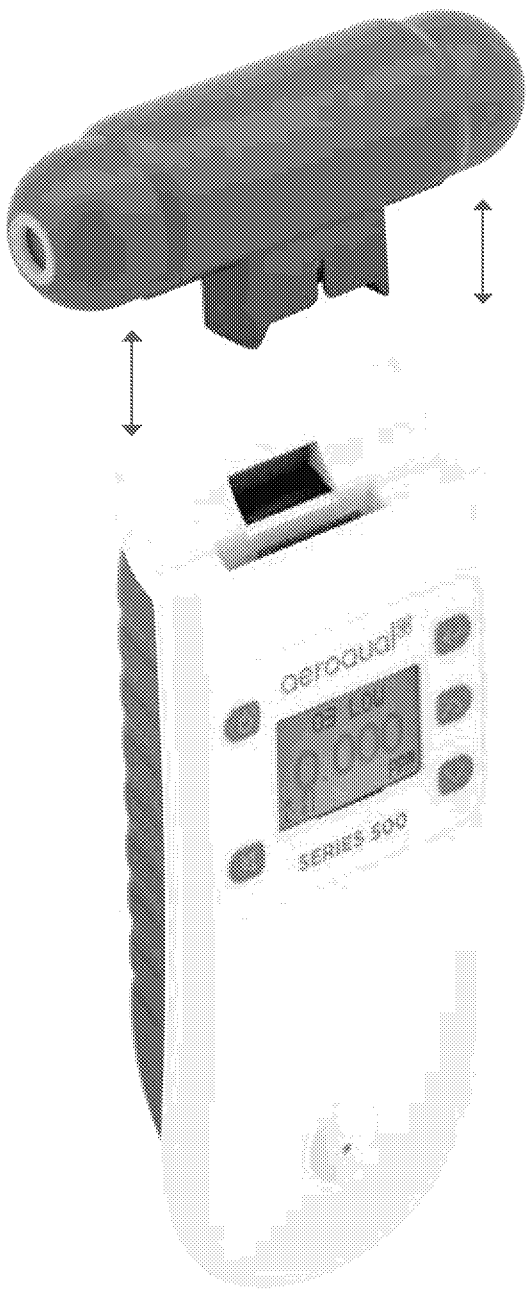
Analyze data

Analyze your data to identify trends, discover leaks or pollution hotspots, or dive deep into the numbers for research.

ED_013931A_00000938-00003

Monitor functions

The monitor base is an electronics platform with an ergonomic design into which you plug your chosen sensor head(s). The monitor base has a range of features that allow it to be used in a variety of different applications. The image and functions shown below are for the Series 500 monitor. For a comparison of the different monitor bases see page 22.



Interchangeable sensor heads

Field replaceable long life lithium battery

Minimum, maximum and average readings

Measurement units ppm or mg/m³

Zero calibration

Location and Monitor ID

Span calibration

0-5V Analog output

External transistor outputs

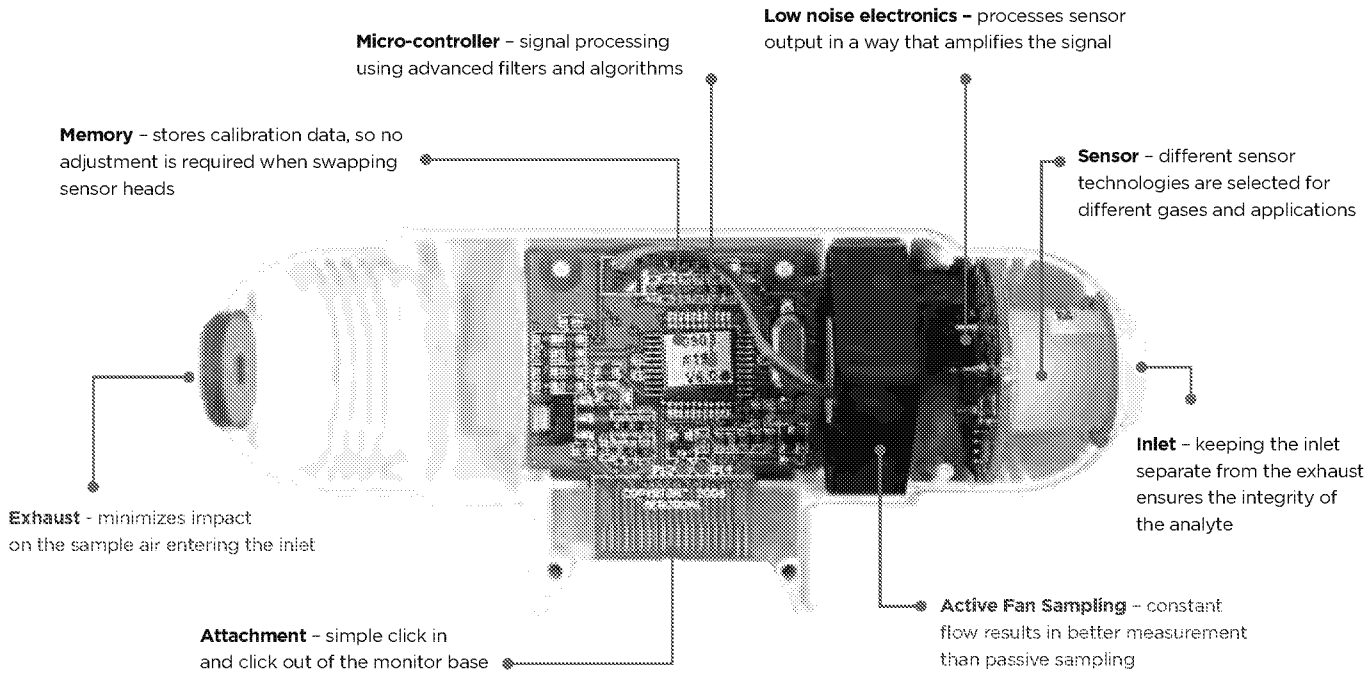
High and low alarms

Data logging

Aeroqual Software

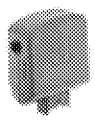
Sensor heads

Sensors are housed within an interchangeable 'sensor head' that attaches to the monitor base. You can choose from up to 27 different sensor heads. Each sensor contains a single gas or particle sensor. Swapping sensor heads takes seconds and no configuration or re-calibration is required.



Right tool, right job

Aeroqual uses a mix of sensor technologies; we select each one based on rigorous testing and depending on the target pollutant and application.

SENSOR TYPE*	DESCRIPTION	PARAMETERS	SENSOR
GSS	Our gas sensitive semiconductor (GSS) sensor uses proprietary sensing material, built in automatic baseline correction (ABC) and interference rejection. This combination results in ppb resolution and a highly linear response.	Ammonia, Carbon monoxide, Hydrogen, Methane, Ozone, Perchloroethylene, VOC	
GSE	Our gas sensitive electrochemical (GSE) sensors generate nano-amp currents proportional to the gas concentration. Aeroqual uses low noise electronics to capture these signals resulting in low detection levels.	Ammonia, Carbon monoxide, Chlorine, Formaldehyde, Hydrogen sulfide, Nitrogen dioxide, Ozone, Sulfur dioxide	
LPC	Our laser particle counter (LPC) for Particulate Matter (PM) measurements uses optimized signal processing using low noise electronics, we add algorithms to correct for interferences, e.g. humidity.	Particulate Matter	
NDIR	Our non-dispersive infrared (NDIR) sensor uses infra-red light, a narrow band-pass filter and photodiode to measure the intensity of light at the gas absorption band. The light intensity is proportional to the gas concentration.	Carbon dioxide	
PID	Our photoionization detector (PID) sensor uses a krypton filled UV lamp to ionize VOC gas molecules and generate a current that is proportional to the VOC concentration. The PID sensor responds to a wide range of VOCs and is industry recognized.	VOC	

*All sensors in the portable range benefit from active sampling and come factory calibrated.

ED_013931A_00000938-00005

Applications

Over the last 15 years we have made and delivered more than 10,000 portable monitors. The applications below are just some of the ways in which our customers put their monitors to use.

Indoor air quality

Indoor air features a range of pollutants that can be very different to those found outdoors. Aeroqual portable monitors can be used indoors and outdoors for applications ranging from air quality monitoring, health and safety, or process control.

Construction dust and emissions

Construction and remediation activity can have significant impact on local receptors, over and above general urban pollution levels. The portable monitor can be used to spot check PM, NO_2 and VOCs around construction sites.

Transport emissions

In most cities transport emissions are a major contributor to urban air pollution. Pollution from mobile sources (on and off road vehicles, ships and aircraft) often includes CO, PM, NO2, and VOCs.

Smog monitoring

Smog formation and distribution can be challenging to model and predict. Ozone and $PM_{2.5}$ are the primary pollutants; the contributing pollutants are NO_2 and VOC. Portable monitors sampling a wide area can gain new insight into smog patterns.

Air quality model validation

Validating air quality models is complex, affected by scale and the micro-environment. Methods such as diffusion tubes may provide spatial accuracy but temporal precision is forfeited. Taking real-time measurements, Aeroqual portable monitors overcome these limitations.

Community exposure studies

Pollution exposure varies widely within a city depending on pollution sources, meteorological effects and topography. Aeroqual portable monitors offer community groups cost-effective tools for measuring a wide range of pollutants in a robust and defensible way.

ED_013931A_00000938-00006

Particulate Matter

Why measure it?

Airborne particulate matter (PM) is categorized into different size fractions. Total Suspended Particulate (TSP) includes all particle sizes and is a good measure of nuisance dust. PM_{10} (particles ≤ 10 microns) is a criteria pollutant and is a serious health risk because PM_{10} particles can penetrate the lungs. $PM_{2.5}$ (particles ≤ 2.5 microns) is also a criteria pollutant which has even greater health impact due to risk of penetration deeper into the respiratory system. Research has linked particulate pollution to lung and heart disease, strokes, cancer, and reproductive harm.

Where does it come from?

Natural sources

Large particles (generally PM_{10} and above) come from natural sources stirred up by wind or human activity. PM_{10} occurs naturally; for example, as sea salt, dust (airborne soil), or pollen. Airborne soil particles, although natural, are also produced by human-made processes such as construction and industrial activities. Natural particulates can make up a large portion of PM_{10} in some areas.

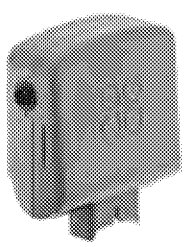
As a pollutant

Small particles (generally $PM_{2.5}$ and below) are by-products of combustion, e.g. emissions from vehicles and power stations. Particles from these sources react with other gases in the atmosphere to create particles of various chemical compositions. Gas to particle conversion can also produce fine particulate.

How we measure it

In the portable monitor range we use a laser particle counter (LPC) for its small size and portability.*

Like all sensors in the portable range the PM sensor benefits from active fan sampling and comes factory calibrated.



PARTICULATE MATTER	SENSOR CODE	SENSOR TYPE	RANGE (mg /m³)	MINIMUM DETECTION LIMIT (mg /m³)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (mg /m³)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
($PM_{2.5}$) (PM_{10})	PM	LPC	0.001-1.000	0.001	±0.005 mg/m³ + 15%	0.001	5	0 to 40°C	0 to 90%	✓	✓	✓

*Refer to table on page 4 for sensor technology description.

ED_013931A_00000938-00007

Ammonia

Why measure it?

Ammonia gas (NH_3) is made up of nitrogen and hydrogen atoms. Ammonia is a toxic gas which can cause burning in the respiratory tract when inhaled. It also has a distinct odor which can become a nuisance for those nearby emission sources.

Where does it come from?

Natural sources

Ammonia is an important compound in many biological processes and is a key part of the nitrogen cycle. It occurs naturally at trace concentrations in the atmosphere mainly from the decomposition of organic matter but is also used in industrial processes. It is a basic compound and reacts with acidic gases (such as NO_2 and SO_2) in the atmosphere to form secondary aerosols (fine particles).

Agricultural sources

Ammonia emissions are primarily from animal agriculture. In particular, livestock and poultry operations where it is a common by-product of animal waste. Fertilizer use also generates ambient NH_3.

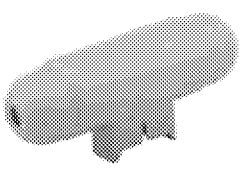
Industrial uses

Ammonia is used in the manufacture of several products including plastics, textiles and pesticides as well as in the fermentation industry and as an antimicrobial agent. It is emitted from vehicles fitted with 3-way catalytic convertors. It is used in industrial refrigeration systems which are usually fitted with NH_3 leak detectors for health and safety. It is also found in many household and industrial strength cleaning products, although NH_3 solution (NH_3 dissolved in water) does not cause high enough NH_3 concentrations to be harmful to health.

How we measure it

In the portable monitor range we measure ammonia using an electrochemical sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Ammonia (NH_3)	NH	GSS	0-1000	2	<±5 ppm +15%	1	30	0 to 40°C	10 to 90%	...	...	✓
	ENG	GSE	0-100	0.2	<±0.5 ppm + 10%	0.1	120	0 to 40°C	15 to 90%	...	...	✓

*Refer to table on page 4 for sensor technology description.

ED_013931A_00000938-00008

Carbon Dioxide

Why measure it?

Carbon dioxide (CO_2) is a naturally occurring gas which acts as the primary source of carbon in life on Earth. It is also a primary greenhouse gas; carbon dioxide absorbs and emits infrared radiation causing warming of the Earth's surface and lower atmosphere. Indoors, elevated levels of CO_2 can lead to drowsiness, headaches as well as a reduction in productivity.

Where does it come from?

Natural sources

In the carbon cycle, carbon is released into the atmosphere from various sources and absorbed again in natural sinks (reservoirs). Humans and plants give off carbon dioxide through respiration, making them a source of CO_2. Plants absorb CO_2 during photosynthesis, making them a sink. The ocean acts both as a source and a sink, releasing CO_2 and absorbing it through natural processes. Volcanic eruptions act as a natural source of CO_2.

Industrial sources

Since the industrial revolution there has been a significant increase in atmospheric carbon dioxide due to human activity. The main sources of CO_2 gas include electricity generation, transportation, and industrial processes which all involve combustion of fossil fuels. The increase in atmospheric CO_2 has been shown to cause changes in the global environment including climate change and ocean acidification.

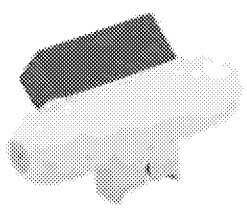
Indoor sources

People are the main source of carbon dioxide emissions in indoor environments due to CO_2 being the main gas emitted during respiration. The higher the number of occupants in a building space, the higher the concentration of CO_2. Most heating, ventilation and air conditioning (HVAC) systems re-circulate indoor air leading to increasing CO_2 concentrations. It is therefore important to measure indoor CO_2 to ensure healthy levels are maintained.

How we measure it

In the portable monitor range carbon dioxide is measured using a non-dispersive infrared (NDIR) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Carbon dioxide (CO_2)	CD	NDIR	0-2000	10	<±10 ppm + 5%	1	120	0 to 40°C	0 to 95%	✓	✓	-
	CE	NDIR	0-5000	20	<±20 ppm + 5%	1	120	0 to 40°C	0 to 95%	-	✓	✓

*Refer to table on page 4 for sensor technology description.

ED_013931A_00000938-00009

Carbon Monoxide

Why measure it?

Carbon monoxide (CO) is a toxic, odorless gas. If inhaled it will displace oxygen from the hemoglobin molecule in our blood and lead to severe disability or even death. It is one of the 'criteria' pollutants measured in ambient air.

Where does it come from?

Outdoor sources

Carbon monoxide is found naturally at low concentrations in the atmosphere from volcanic activity and forest fires. CO is produced from the partial oxidation of carbon-containing compounds in situations where there is not enough oxygen present to produce carbon dioxide. The main source of outdoor CO is combustion processes from transportation and industrial activity.

Indoor sources

Malfunctioning fuel burning appliances such as furnaces, cookers, water boilers and gas room heaters can all lead to carbon monoxide leaks in areas occupied by people.

Industrial uses

Carbon monoxide is very important in industry since it is a precursor to a number of important organic chemicals. CO gas has various niche applications in the chemical, food, medical, and semiconductor industries.

How we measure it

In the portable monitor range we measure carbon monoxide using either a gas sensitive semiconductor (GSS) sensor or a gas sensitive electrochemical (GSE) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Carbon monoxide (CO)	ECM	GSE	0-25	0.05	<±0.5 ppm 0-5 ppm <±10% 5-25 ppm	0.01	60	0 to 40°C	15 to 90%	✓	...	...
	ECN	GSE	0-100	0.2	<±1 ppm 0-10 ppm <±10% 10-100 ppm	0.1	30	0 to 40°C	15 to 90%	✓	✓	✓
	CO	GSS	0-1000	1	<±2ppm + 15%	1	30	0 to 40°C	10 to 90%	...	...	✓

*Refer to table on page 4 for sensor technology description.

ED_013931A_00000938-00010

Chlorine Gas

Why measure it?

Chlorine gas (Cl_2) has a familiar odor due to its use in household bleach and in public swimming pools.
Cl_2 is a highly reactive gas and therefore combines easily with other elements. High levels of Cl_2 gas can lead to coughing and chest pain as well as irritation and respiratory damage. It is a heavy gas and therefore will accumulate at the bottom of poorly ventilated spaces. There is a risk of explosion if high concentrations of the gas come into contact with flammable materials.

Where does it come from?

Natural sources

In nature, chlorine is too reactive to be present as a gas. Instead it is found in the form of ionic solids such as sodium chloride (common salt) and does not pose a health threat. Chlorides make up much of the salt dissolved in the earth's oceans; about 1.9 % of the mass of seawater is chloride ions.

Industrial uses

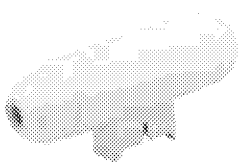
Chlorine is widely used in the production of consumer goods such as plastics, solvents for dry cleaning and metal degreasing, textiles, antiseptics and household cleaning products. The greatest risk to workers is from Cl_2 leaks.

Chlorine is an important chemical used in water sanitation as it is capable of killing bacteria and other microbes present in water. It is commonly used to clean drinking water, waste water and public swimming pools.

How we measure it

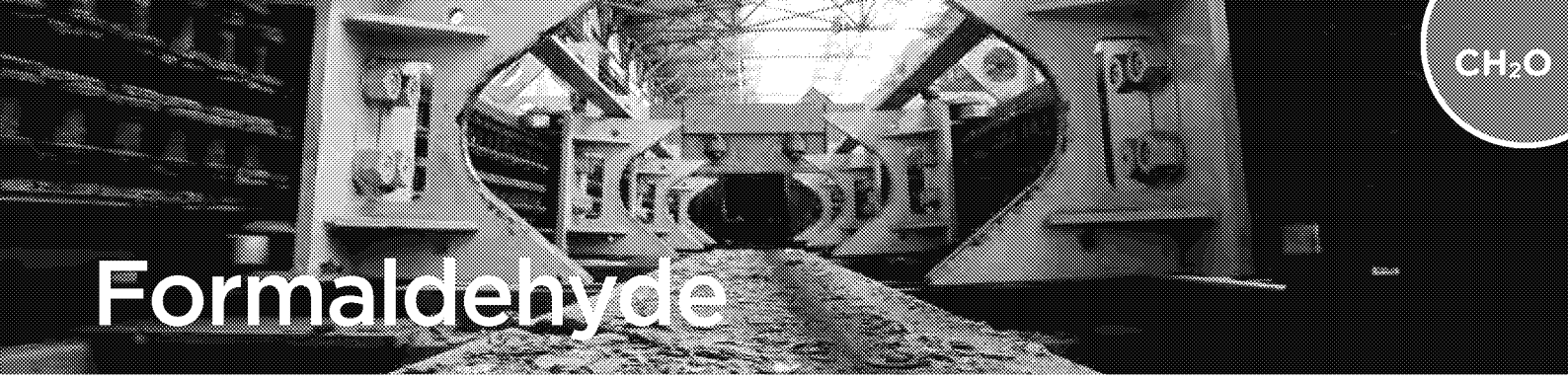
In the portable monitor range we measure chlorine gas using a gas sensitive electrochemical (GSE) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Chlorine (Cl_2)	ECL	GSE	0-10	0.01	<±0.02 ppm + 10%	0.01	30	0 to 40°C	15 to 90%	✓	–	✓

*Refer to table on page 4 for sensor technology description.



Formaldehyde

Why measure it?

Formaldehyde gas (CH_2O) is a flammable gas that enters the atmosphere through natural sources such as forest fires, by direct human activities, and via reactions between other compounds in the atmosphere. It is commonly sold commercially as a 30% solution in water for preservation purposes. It has a pungent irritating odor. CH_2O in all its forms is highly toxic to all animals. Occupational exposure is mainly via the inhalation of vapors and can be known to cause headaches, difficulty breathing and burning in the throat.

Where does it come from?

Natural sources

Most formaldehyde found in the environment is a result of processes taking place in the upper atmosphere. It is an intermediate gas which is produced during the oxidation of methane and can be used as an indicator of anthropogenic pollution and biomass burning. It does not accumulate in the environment as it is easily broken down by sunlight.

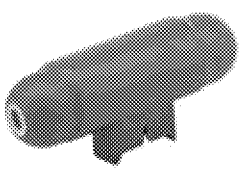
Industrial uses

Formaldehyde is a precursor to more complex compounds used in several industrial applications. It is commonly used in resins for the manufacture of composite wood products and plastics. CH_2O solution is used as a disinfectant to kill most bacteria and fungi and can also be used to preserve tissues or cells for scientific analysis. CH_2O enters the body through inhalation.

How we measure it

In the portable monitor range we measure formaldehyde using a gas sensitive electrochemical (GSE) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Formaldehyde (CH_2O)	EF	GSE	0-10	0.01	<±0.05 ppm 0-0.5 ppm <±10% 0.5-10 ppm	0.01	30	0 to 40°C	15 to 90%	-	-	✓

*Refer to table on page 4 for sensor technology description.

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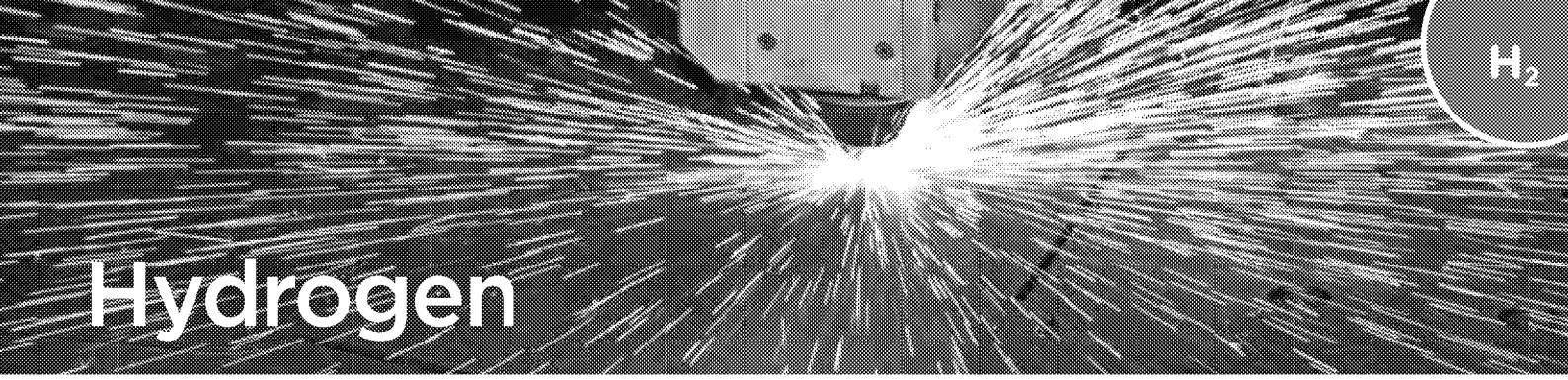


Hydrogen

Why measure it?

Hydrogen (H_2) is odorless, tasteless and colorless, so leaks are very hard to detect. Hydrogen can be hazardous to human safety as it is a highly flammable gas when mixed with air.

Where does it come from?

Natural sources

Hydrogen is the most abundant chemical substance in the universe. However, pure hydrogen gas (H_2) is scarce in the Earth's atmosphere. It is lighter than air and therefore escapes Earth's gravity easier than other heavier gases.

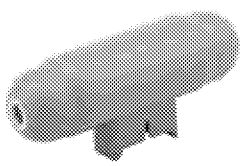
Industrial uses

The most common use of hydrogen gas is in the petroleum and chemical industries. High concentrations of the gas are used to process fossil fuels and produce ammonia for fertilizer applications. Other industrial applications include its use as a coolant, a shielding gas in welding, a tracer gas for leak detection and within the semiconductor industry.

How we measure it

In the portable monitor range we measure hydrogen using a gas sensitive semiconductor (GSS) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPES		
								TEMP	RH	ENV	IAQ	IND
Hydrogen (H_2)	HA	GSS	0-5000	5	<±10 ppm + 10%	1	30	0 to 40°C	10 to 90%	-	-	✓

*Refer to table on page 4 for sensor technology description.

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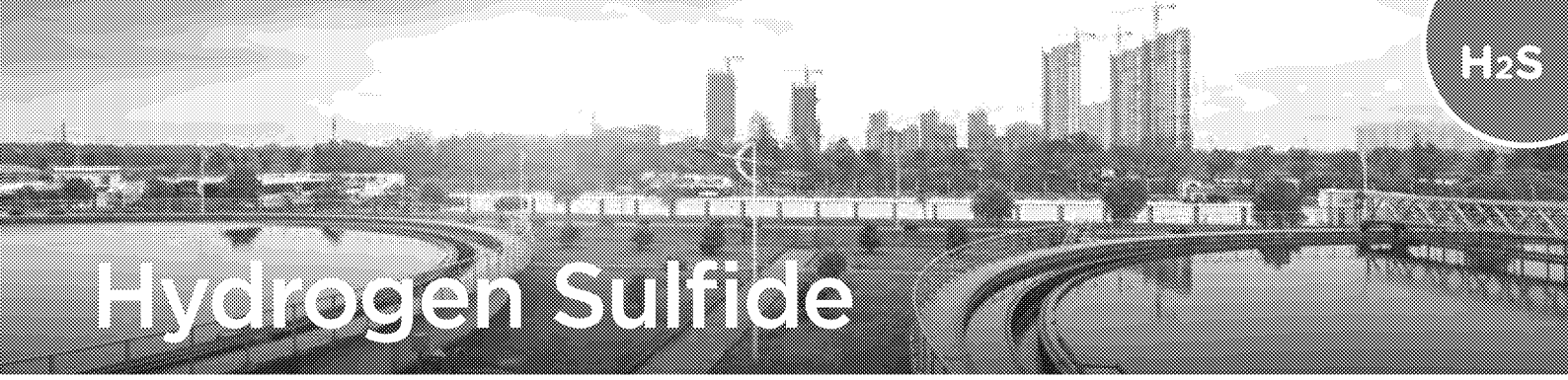

Hydrogen Sulfide

Why measure it?

Hydrogen sulfide (H_2S) is a colorless, toxic gas which has a very distinct odor even at very low concentrations. The odor is very offensive and has a similarity to rotten eggs. In general, people exposed to such low concentrations of H_2S will not suffer health problems however it is still unpleasant due to the strong smell. An increase in H_2S levels can lead to eye irritation, nausea and shortness of breath. If concentrations continue to increase it can eventually damage the nervous system and result in death.

Where does it come from?

Natural sources

Hydrogen sulfide is formed as a result of bacterial breakdown of organic matter containing sulfur in the absence of oxygen. Natural sources include hot sulfur springs, lakes, swamps and volcanic gas. Human activity can increase the release of H_2S and due to its toxicity, concentrations should be closely monitored.

Industrial sources

The largest industrial source of hydrogen sulfide is in oil refining. It is also found in natural gas fields and must be separated and removed during the refining process. Other industrial sources include coke production, waste-water treatment plants, landfill sites, farms, and wood pulp production. H_2S odor is often considered a nuisance at industrial sites which are located close to built-up areas.

How we measure it

In the portable monitor range we measure hydrogen sulfide using a gas sensitive electrochemical (GSE) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Hydrogen sulfide (H_2S)	EHS	GSE	0-10	0.04	<±0.05 ppm 0-0.5 ppm <±10% 0.5-10 ppm	0.01	30	0 to 40°C	15 to 90%	✓	...	...
	EHT	GSE	0-100	0.4	<±0.5 ppm 0-5 ppm <±10% 5-100 ppm	0.1	30	0 to 40°C	15 to 90%	...	...	✓

*Refer to table on page 4 for sensor technology description.

Methane

Why measure it?

Methane (CH_4) is a non-toxic gas but extremely flammable and can form explosive mixtures with air. Its explosive limits are between 5 % (lower explosive limit) and 15 % (upper explosive limit) in air. In poorly ventilated areas it is important to ensure the concentration does not exceed safe levels. CH_4 displaces oxygen which could lead to asphyxia if leaks occur.

Where does it come from?

Natural sources

In the environment methane is found underground and below the sea floor where it is slowly released into the atmosphere. It is the main component of natural gas and therefore used as a fuel especially in electricity generation. In many cities it is also piped directly into homes and used for heating and cooking. When released into the atmosphere CH_4 is dispersed rapidly as it is lighter than air.

Industrial sources

The most common source of methane exposure is around landfill sites. CH_4 gas is produced naturally via a process called methanogenesis which is a form of anaerobic respiration used by organisms found at landfills. Landfill off-gas can penetrate the interiors of buildings built on or near landfills. Methanogenesis also occurs in ruminants, such as cattle, and therefore CH_4 concentrations can also be higher at cattle farms.

How we measure it

In the portable monitor range we measure methane using a gas sensitive semiconductor (GSS) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Methane (CH_4)	MT	GSS	0-10000	10	<±20 ppm + 15%	1	60	0 to 40°C	10 to 90%	..	..	✓

*Refer to table on page 4 for sensor technology description.

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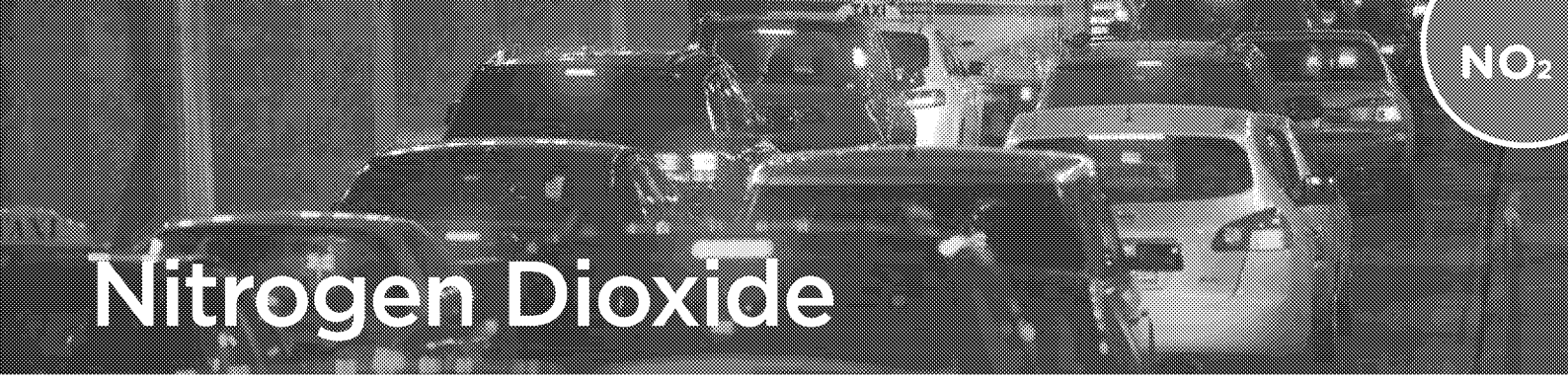

Nitrogen Dioxide

Why measure it?

Inhalation of nitrogen dioxide (NO_2) can impair lung function and increase susceptibility to infection, particularly in children. It can also aggravate asthma. NO_2 is not only a toxic gas but it is also a precursor to several harmful secondary air pollutants such as ozone and particulate matter. It also plays a role in the formation of acid rain and photochemical smog.

Where does it come from?

Natural sources

Nitrogen dioxide is not usually released directly into the air. NO_2 forms when nitric oxide (NO) and other nitric oxides (NO_X) react with other chemicals in the air. Some NO_2 is formed naturally in the atmosphere by lightning and some is produced by plants, soil and water.

As a pollutant

The major source of nitrogen dioxide in urban environments is the burning of fossil fuels. In urban areas this is most commonly associated with motor vehicle exhaust. Areas with high density road networks close to large populations such as in towns and cities are most at risk of over exposure. Industrial sites will also produce high concentrations of NO_2. These include any industry that use combustion processes such as power plants, electric utilities and industrial boilers.

How we measure it

In the portable monitor range we measure nitrogen dioxide using an electrochemical sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Nitrogen dioxide (NO_2)	ENW	CiTiE	0-1	0.005	<±0.02 ppm 0-0.2 ppm <±10% 0.2-1 ppm	0.001	30	0 to 40°C	15 to 90%	✓	–	–

*Refer to table on page 4 for sensor technology description.

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Ozone

Why measure it?

In the upper atmosphere 'good' ozone (O_3) protects life on Earth from the sun's ultraviolet rays. At ground level 'bad' ozone is a criteria pollutant that is a significant health risk, especially for people with asthma. It also damages crops, trees and other vegetation and is a main component of smog.

Where does it come from?

Natural sources

Most ozone (about 90%) resides in a layer that begins between 6 and 10 miles (10 and 17 kilometers) above the Earth's surface and extends up to about 30 miles (50 kilometers). This region of the atmosphere is called the stratosphere. The O_3 in this region is commonly known as the ozone layer. Atmospheric turbulence and mixing of this layer into the lower troposphere results in a natural background concentration of about 0.03 to 0.04 ppm (30 to 40 ppb) of O_3 at ground level.

As a pollutant

Ground level ozone above the natural background is not emitted directly but is created by chemical reactions between the precursors; oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. The major sources of NOx and VOC are industrial facilities, vehicle exhaust, gasoline vapors, and chemical solvents. The O_3 reaction dynamics are such that concentrations are often highest downwind of the precursor sources and on the outskirts of urban areas.

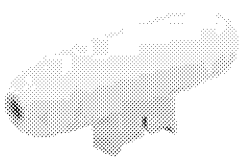
Industrial uses

Ozone has found a range of industrial uses primarily as a disinfectant or sterilizing agent. It is used extensively in the food and beverage industry, water treatment, manufacturing, odor control, and sterilization in medical and domestic environments.

How we measure it

In the portable monitor range we measure ozone using either a gas sensitive semiconductor (GSS) sensor or a gas sensitive electrochemical sensor (GSE).*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Ozone (O_3)	OZU	GSS	0-0.15	0.001	<±0.005 ppm	0.001	60	0 to 40°C	10 to 90%	✓	✓	–
	OZL	GSS	0-0.5	0.001	<±0.008 ppm 0-0.1 ppm <±10% 0.1-0.5 ppm	0.001	60	0 to 40°C	10 to 90%	✓	✓	✓
	EOZ	GSE	0-10	0.01	<±0.01 ppm + 7.5%	0.01	60	0 to 40°C	15 to 90%	–	✓	✓

*Refer to table on page 4 for sensor technology description.

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C_2Cl_4

Perchloroethylene

Why measure it?

Perchloroethylene (C_2Cl_4), which is also sometimes referred to as Tetrachloroethylene or PERC, is a colorless liquid. The liquid readily evaporates into the air and can be toxic to humans if inhaled. Health problems from exposure include headaches, irritation and neurological damage. Long term exposure can also result in various cancers forming in the body.

Where does it come from?

Industrial uses

Perchloroethylene is an effective chemical solvent used to dry clean clothes. Modern dry cleaning practices have resulted in a significant decrease in the concentration of C_2Cl_4 being used. However, due to the negative health effects caused by long term exposure, control and monitoring of C_2Cl_4 is still important in order to keep employees safe in these environments.

Perchloroethylene is also widely used to remove oil and oil-borne contaminants from objects that have undergone processes such as machining, welding and soldering. Modern vapor degreasing techniques have become common practice in the automotive and electronic manufacturing industries.

How we measure it

In the portable monitor range we measure perchloroethylene using a gas sensitive semiconductor (GSS) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Perchloroethylene (C_2Cl_4)	PE	GSS	0-200	1	<±5 ppm 0-50 ppm <±10% 50-200 ppm	1	30	0 to 40°C	10 to 90%	–	✓	✓

*Refer to table on page 4 for sensor technology description.

SO_2

Sulfur Dioxide

Why measure it?

Sulfur dioxide (SO_2) is a toxic gas with a strong irritating smell. Inhaling sulfur dioxide has been associated with respiratory disease and difficulty breathing. It is also a precursor to acid rain and atmospheric particulates.

Where does it come from?

Natural sources

Sulfur dioxide is present at very low concentrations in the atmosphere and is naturally emitted during volcanic eruptions, as well as at geothermal sites.

As a pollutant

Fossil fuel combustion at power plants is the largest emission source of SO_2 into the atmosphere. Other sources include extracting metal from ore and the burning of high sulfur containing fuels by ships, trains and machinery. Perimeter monitoring at industrial sites is common to measure the concentration of SO_2 being emitted into the atmosphere.

Industrial uses

Sulfur dioxide is an intermediate component in the formation of sulfuric acid. Sulfuric acid is a very important commodity chemical used in several industrial processes including the fertiliser industry and metal treatments. SO_2 gas is also used directly in many industries. It acts as a preservative for dried fruits due to its antimicrobial properties and is used in wine making (in the form sodium bisulfite) to protect the wine from spoilage.

How we measure it

In the portable monitor range we measure sulfur dioxide using a gas sensitive electrochemical (GSE) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.

GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME (S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Sulfur dioxide (SO_2)	ESO	GSE	0-10	0.04	<±0.05 ppm 0-0.5 ppm <±10% 0.5-10 ppm	0.01	60	0 to 40°C	15 to 90%	✓	✓	-
	ESP	GSE	0-100	0.4	<±0.5 ppm 0-5 ppm <±10% 5-100 ppm	0.1	30	0 to 40°C	15 to 90%	-	-	✓

*Refer to table on page 4 for sensor technology description.

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Volatile Organic Compounds

Why measure it?

Volatile organic compounds (VOCs) are carbon containing gases and vapors such as gasoline fumes and solvents. They evaporate easily at ordinary room temperature which is why they are termed volatile. Many VOCs such as benzene and formaldehyde are highly toxic and can cause cancer and other serious health problems. VOCs such as 1,3 butadiene are also involved in the formation of ground level ozone. The severity of the health effect depends largely on the type of organic compound present as well as the exposure time.

Where do they come from?

Natural sources

The largest source of VOCs is from vegetation however some compounds notably benzene are created during volcanic eruptions and forest fires. Although natural sources of VOC emissions are larger overall, anthropogenic sources are the main contributors of VOCs in urban areas.

As a pollutant

Anthropogenic sources include fuel production, distribution, and combustion. The largest emissions come from motor vehicles due to either evaporation or incomplete combustion of fuel, and from biomass burning.

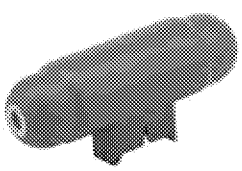
Indoor sources

Typical indoor VOC sources include paint, cleaning supplies, furnishings, glues, permanent markers and printing equipment. Levels can be particularly high when ventilation is limited.

How we measure it

In the portable monitor range we measure VOC using either a photo-ionization detector (PID) or a gas sensitive semiconductor (GSS) sensor.*

Like all sensors in the portable monitor range the sensor benefits from active fan sampling and comes factory calibrated.



GAS	SENSOR CODE	SENSOR TYPE	RANGE (PPM)	MINIMUM DETECTION LIMIT (PPM)	ACCURACY OF FACTORY CALIBRATION	RESOLUTION (PPM)	RESPONSE TIME(S)	OPERATING CONDITIONS		APPLICATION TYPE		
								TEMP	RH	ENV	IAQ	IND
Volatile Organic Compound (VOC)	VM	GSS	0-25	0.1	<±0.1 ppm + 10%	0.1	60	0 to 40°C	10 to 90%	✓	✓	-
	VP	GSS	0-500	1	<±5 ppm + 10%	1	30	0 to 40°C	10 to 90%	-	-	✓
	PDL	PID	0-20	0.01	<±0.02 ppm + 10%	0.01	30	0 to 40°C	0 to 95%	✓	✓	-
	PDH	PID	0-2000	0.1	<±0.2 ppm + 10%	<1000 ppm: 0.1 >1000 ppm: 1	30	0 to 40°C	0 to 95%	-	-	✓

*Refer to table on page 4 for sensor technology description.

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Maintenance & Calibration

Aeroqual portable monitors are designed for continuous use and require minimal maintenance and calibration.

Maintenance

	1 YEAR	2 YEARS
ACTIVITY	Calibration In order to maintain measurement accuracy, we recommend that sensor heads are re-calibrated on a yearly basis or more often if measurement certainty is critical for the application.	Replacement Every sensor has a finite life due to environmental exposure, chemical life and oxidation. To ensure continuous uninterrupted operation we recommend you plan for replacement of sensors at 2 years.
WHO	We recommend calibration is performed by the factory. Calibration can performed in the field with a Series 500 and suitable equipment.	Contact Aeroqual or an authorized representative.

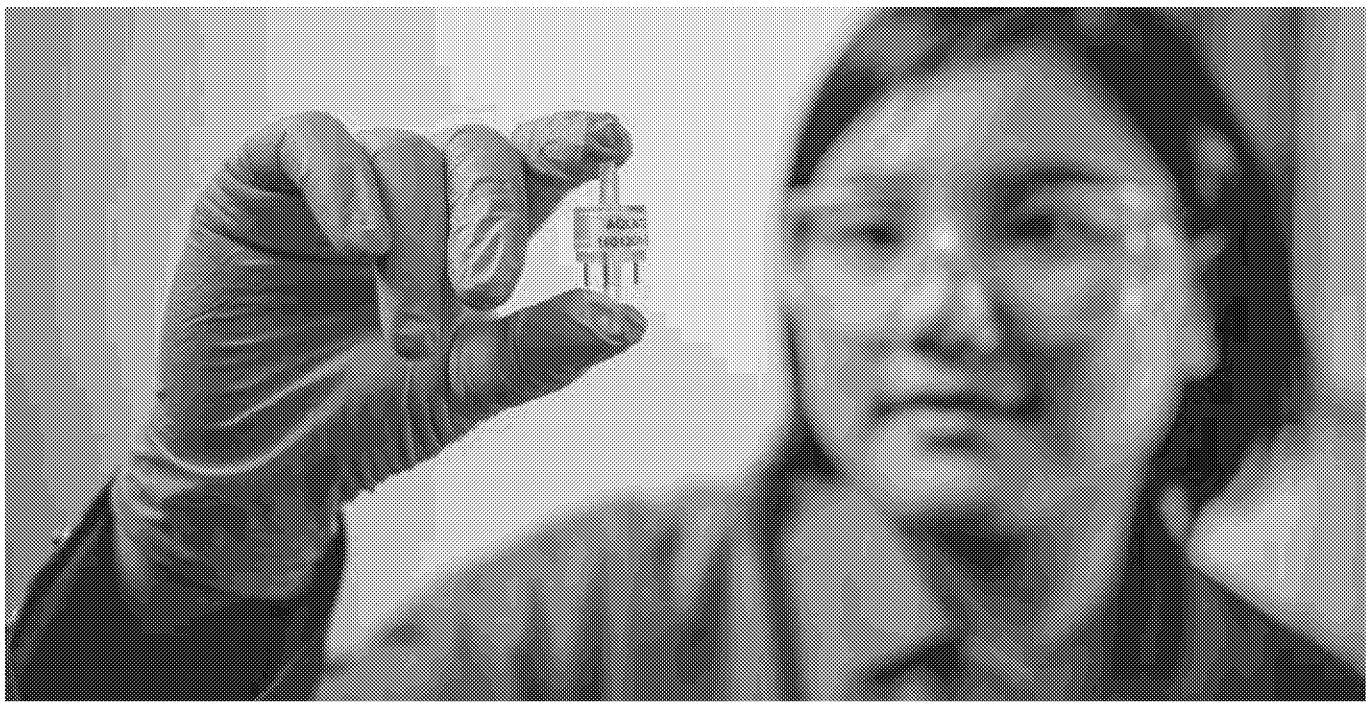
Calibration

Factory Calibration

Most of our sensors can have calibration performed in the field with a Series 500 and suitable equipment. Where this is not available, or for added assurance, we offer factory calibration.

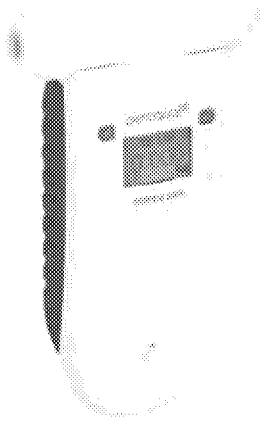
Field Calibration

We offer a calibration accessory for field calibration. The calibration accessory is a simple and effective tool for calibrating sensor heads. By delivering a consistent flow of calibration gas to the sensor head, without forcing air at the sensor, it ensures the most accurate calibration possible. It can also be used to humidify the gas which is important for best results with GSS sensors.

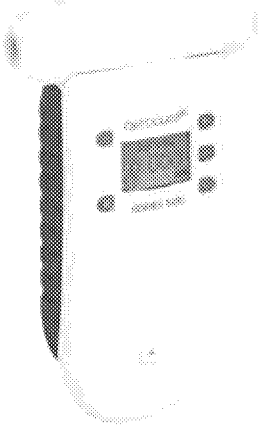


Monitor bases

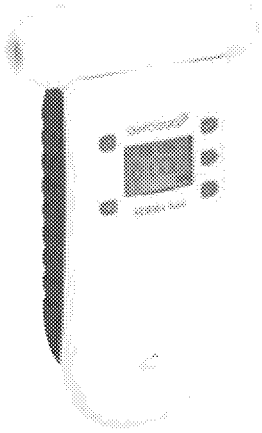
Aeroqual portable air quality monitors are a cost-effective solution to measure multiple target gases and particulate at different concentrations in indoor and outdoor applications. Use the guide below to identify a model suitable for your requirements.



Series 200



Series 300



Series 500

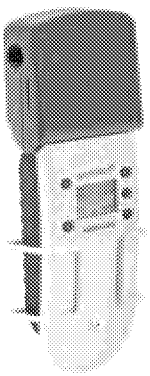
Which monitor do I need?

For real-time display measurements and zero calibration, the Series 200 is a cost effective solution. If an audible alarm or analogue output are required, along with the ability to make gain adjustments, choose the Series 300. For all these features and data logging, our flagship Series 500 is a clear choice.

Feature	Series 200	Series 300	Series 500
Simple to use, easy to maintain, multiple applications	✓	✓	✓
Interchangeable gas sensor heads	✓	✓	✓
Field replaceable long life Lithium battery (up to 8 hours)	✓	✓	✓
Minimum, maximum and average readings	✓	✓	✓
Zero calibration, gain adjustment	Zero Only	✓	✓
High and low alarms		✓	✓
Analog outputs (0-5V)		✓	✓
Data logging (Up to 8,188 records (2706 incl. temp/RH)			✓
Free desktop software (Series 500)			✓

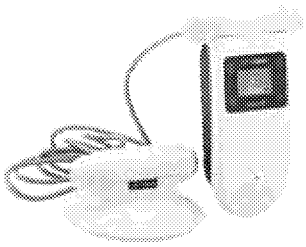
Accessories

We offer a range of accessories to extend the functionality and applications of the portable monitors, and to protect them in dusty or wet environments.

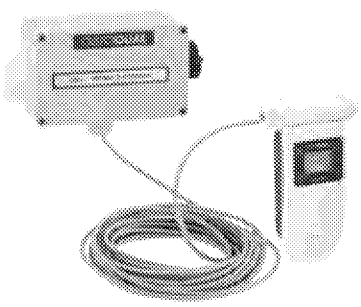


Wall Bracket
AS R33

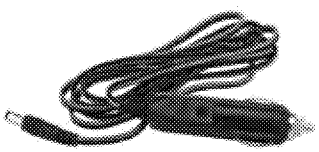
Calibration Kit
AS R42



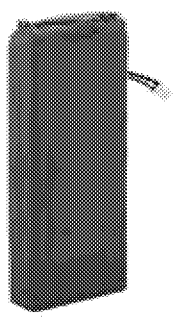
Remote Sensor Kit
AS R10



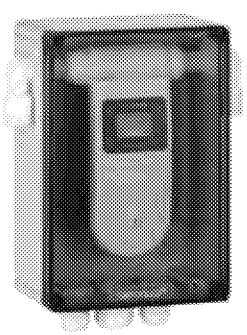
IP41 Remote Sensor Kit
AS R13



Cigarette Lighter Adapter
AS R32



Lithiim Battery
AS R36



Industrial Enclosure
HH ENC

Carry Case Small
AS R40

Carry Case Large
AS R41

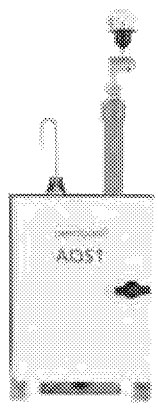
Other Products

Our ambient air monitoring product range spans portable and fixed instruments for spot checks and surveys, short and long term monitoring. The products have been designed to maximise accuracy and affordability, and are easy to deploy and easy to use. With a decade of experience making sensor-based air quality instruments, we are innovating and releasing new products at a rapid rate. Keep in touch with us to hear about the latest developments.

Dust Monitors

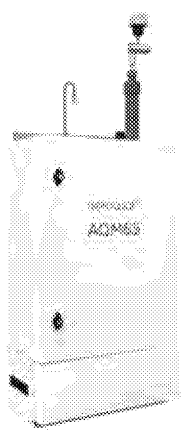
- Fixed instruments for outdoor ambient monitoring
- Laser-based detection allows real-time measurement
- Choose from TSP, PM_{10}, $PM_{2.5}$ and PM_1
- Optional wind, noise, weather sensors
- MCERTS certified Dust Sentry PM_{10}
- Applications: fenceline monitoring, roadside monitoring, air quality research, short term studies

MCERTS, a world first - Our Dust Sentry PM_{10} was the world's first nephelometer to pass the MCERTS indicative particle monitoring standard of the UK's Environment Agency.



AQS 1

- Fixed instruments for urban outdoor ambient monitoring
- Measure particulate matter (PM) and/or up to two gases simultaneously
- Particulate options: TSP, PM_{10}, $PM_{2.5}$ and PM_1
- Gas options: O_3, NO_2, VOC
- Optional wind, noise, weather sensors
- Applications: construction monitoring, roadside emissions, rail corridor and terminal emissions, mapping smog formation & distribution, validation of air quality models, community exposure studies



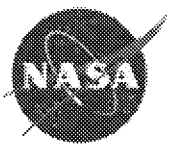
Air Quality Monitoring Systems

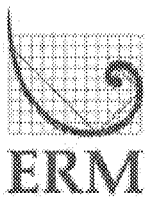
- 'Near Reference' multi-parameter monitoring
- Simultaneous measurement of gas, particulate, and environmental conditions (wind, noise, solar)
- Capable of monitoring to WHO requirements
- 1ppb detection of O_3, NO_2, NOx; <10ppb SO_2
- Optional integrated calibration
- Applications: national air monitoring networks, urban air monitoring, industrial fenceline monitoring, air quality research

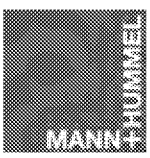
MCERTS, Certified Product: Indicative Ambient Particulate Monitors.

Hi-Tech Awards, Winner: Innovative Hardware Award.

Just a handful of customers who chose Aeroqual:







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BERKSHIRE ENVIRONMENTAL ACTION TEAM
20 Chapel St. Pittsfield, MA 01201 • thebeatnews.org
413-464-9402 • team@thebeatnews.org

Protecting the environment for wildlife in support of the natural world that sustains us all.

March 15, 2022

BEAT as a Community Organization Mission Statement

BEAT's mission is to work with our community to protect the environment for wildlife in support of the natural world that sustains us all. BEAT works with individuals and partner organizations to identify issues that affect our area where we can take effective action to reduce air and water pollution, to connect and protect wildlife habitat, and to engage people in our community in the natural world around them.

BEAT is headquartered in Pittsfield, Massachusetts, a Gateway City[1] that has a declining population, Environmental Justice neighborhoods with lower life expectancies than average for the City, and much lower median income than average for the state. BEAT works in these neighborhoods, hires associates from these neighborhoods, and partners with organizations who also work in these neighborhoods.

Pittsfield is a city that has never fully recovered from the loss of the General Electric Company, nor from the pollution that company left behind.We have been actively involved in advocating for a more thorough remediation of General Electric Company's PCBs from the Housatonic River watershed since our inception in 2003 and have continued to meet with District 1 EPA, and project manager Dean Tagliaferro, to explore the best available science for remediation in the river and floodplain. We continue to advocate for the best remediation that will be protective of human and environmental health.

Jane Winn, Executive Director

[1] Massachusetts **gateway cities** are "midsize urban centers that anchor regional economies around the state," facing "stubborn social and economic challenges" while retaining "many assets with unrealized potential."

I - Cover Page

Project Title:
Air Quality Monitoring for pollutants relating to disparate health outcomes in the city of Pittsfield, Massachusetts

- **Applicant Information:**
  Applicant Organization: Berkshire Environmental Action Team
  Address: 20 Chapel Street, Pittsfield, MA
  Primary contact: Rosemary Wessel, 413-358-7663, rose@thebeatnews.org
  DUNS number: 0222940420000

- **Set-Aside:** Community Based Organization

- **Brief Description of Applicant Organization:** BEAT works to protect the environment for wildlife in support of the natural world that sustains us all. Aside from our work to preserve natural resources, we address energy and environmental concerns to curb emissions from fossil fuel infrastructure, protecting communities from the impacts of pollution and climate change.

- **Project Partners:**
  West Side Legends, *Tony Jackson*
  NAACP Housing Committee, *Kamaar Taliaferro*
  Central Berkshire Habitat for Humanity, *Carolyn Valli*
  MCLA Public Health Education Department, *Dr. Nicole Porther*
  Berkshire Regional Planning Commission, *Emily Lange*
  Clarity Movement Co, *Sean Wihera*

- **Project Location**: Designated Massachusetts Environmental Justice Neighborhoods, and outlying "control" positions in Pittsfield, MA 01201

- **Air Pollutant Scope:** PM2.5, PM 10, NO2

Budget Summary:

EPA Funding Requested	Total Project Cost
$300,131	$318,834

Project Period: November 2022 - November 2025

Short Project Description: Using ten stationary continuous air monitors and five mobile monitors, BEAT will be monitoring for PM2.5, PM10 and NO2 throughout key locations in Pittsfield, Massachusetts, including environmental justice neighborhoods, near point sources of pollution and in "control" locations away from these centers. Our air quality monitoring will be supplemented by a survey of community health conditions, conducted during the monitoring period, to look for correlating increases or decreases in severity.

II - Workplan:

Section 1 – Project Summary and Approach

A. Overall Project

Using ten stationary continuous air monitors and five mobile monitors, BEAT will be monitoring for PM2.5, PM10 and NO2 throughout key locations in Pittsfield, Massachusetts, including environmental justice neighborhoods, city schools, near point sources of pollution and in "control" locations away from these centers. ***See Equipment descriptions in Section 7 B below.***

We will compile neighborhood-level air quality data to compare with location and weather data. We will also conduct a public health survey in which community members note any existing or new health concerns and increases and decreases in severity, chronologically pairing this data with air quality monitoring results to look for any correlation. We realize this will not be scientifically rigorous, but could provide enough evidence to prompt a formal health study.

This data will be shared with local, regional and state agencies as well as environmental and community action organizations to advocate for changes in policy to lower environmental pollution with the goal of addressing climate impacts and public health, especially in vulnerable environmental justice neighborhoods.

B. Project Significance

Life expectancies in Pittsfield vary widely - by as much as 12 years - between neighborhoods near heavy infrastructure and traffic at the center of town and the more affluent and less dense neighborhoods along the outer regions of the city. At the center of the community are three power plants - two fossil fuel and one trash-burning plant. These neighborhoods also experience heavy traffic from vehicles and trains. Most of the City's elementary schools are located within a mile or less of three power plants.

BEAT has already been working on eliminating pollution sources - having negotiated for transition of one 50 year old kerosene-fired power generation plant to renewables and storage. We're also in talks with the City about transition or closure of a gas/oil fired plant and a trash-burning generation plant.

All of these power plants are within close proximity (2 miles or less) to multiple Environmental Justice communities, especially Morningside and West Side. These two Pittsfield neighborhoods comprise roughly 50% of all residents of color in Pittsfield, even though only 13.2% of Pittsfield's residents are non-white[1]

The data obtained from this study would benefit our organization, project partners and many organizations with whom we often collaborate, and inform local, regional and state initiatives. It's been a long-standing problem that more granular, neighborhood-level air quality and health information has not been available in our region to help guide efforts for environmental protection and remediation. With specific, neighborhood-level data, we can more effectively advocate for social programs and policies to improve health outcomes.
See Expected Outcomes in Section 4 A below.

The Commonwealth of Massachusetts is undergoing a sea change in legislation and regulatory

[1] https://www.census.gov/quickfacts/fact/table/pittsfieldcitymassachusetts/INC110219

policy on decarbonization, energy, and climate adaptation in all sectors, with a mandate to take into consideration the needs and input of grassroots organizations and environmental justice communities. Coming into these state listening sessions and hearings with solid, neighborhood level data will help communities make the best decisions during this time of transition.

Section 2 – Community Involvement

A. Community Partnerships
Berkshire Environmental Action Team has a long-standing record of partnering with multiple organizations, from community environmental, civic and faith organizations, to municipal, regional and state offices and commissions, regulatory agencies, educational institutions and foundations. For this project, we will partner with community based organizations centered in Pittsfield's Environmental Justice neighborhoods and an air quality monitoring organization that specializes in community empowerment. This project is also a way of further extending community outreach by assisting new partners with environmental and health concerns.

• **Berkshire County Branch NAACP Housing Committee**
Kamaar Taliaferro, Chair, kamaart93@gmail.com
Berkshire County Branch NAACP Housing Committee will partner with us on community outreach and public awareness, through its membership base and advocacy at the municipal and county level. They will also be incorporating information from the study to better inform public policy, including the need to invest in residential infrastructure to mitigate the disparate racial impacts of aging housing stock.

• **Central Berkshire Habitat for Humanity**
Carolyn Valli, CEO, cvalli@berkshirehabitat.org
Central Berkshire Habitat for Humanity, located in the West Side neighborhood, will be hosting a stationary air quality monitor. They will also help with community outreach and education, and advocacy for solutions for reduction and/or mitigation of air pollution during and after the project timeline. One of their areas of specialization is construction of affordable net zero housing for LMI residents. Knowledge of air quality conditions at a neighborhood level will inform the level of need for increased air filtration in these new homes.

• **West Side Legends**
Tony Jackson, President, horacetee@aol.com
West Side Legends is a community organization working toward revitalization of the Westside Neighborhood. They will partner with us for community outreach including, searching for mobile monitoring staff within the Westside Neighborhood, recruiting community members to participate in the health conditions survey, participation in and hosting public reporting events, and bringing mobile monitors to community events to increase public awareness. They will also utilize the data from the study to inform future programs and initiatives.

• **Berkshire Regional Planning Commission**
Emily Lange, ELange@berkshireplanning.org
We are coordinating efforts with Berkshire Regional Planning Commission who are planning on conducting surveys in other Berkshire County communities as well as indoor air quality. If they are awarded a grant under this RFA, we can compare indoor samples at Pittsfield schools from their study with outdoor samples at the schools from our study.

• **MCLA Department of Public Health Education**
Dr. Nicole Porther, Professor of Biology, Nicole.Porther@mcla.edu
Under the supervision of Department Head, Dr. Nicole Porther, the Public Health Education Department of the Massachusetts College of Liberal Arts in nearby North Adams, will design and undertake a public health survey. The goal is to have a significant sample size and cross section of residents of Pittsfield logging changes in health conditions for the duration of the air pollution monitoring period. Combined with consultations from area physicians and public health departments, the data gathered will be chronologically compared with air quality and weather condition data to look for hints of correlation. This relationship will provide MCLA students real-life practicum and ties to the Pittsfield community, allow residents to take part in a deeper understanding of pollution impacts, and lead to further, more rigorous public health studies.

• **Clarity Movement**, *Sean Wihera, VP, Development and Partnerships*, sean@clarity.io
We will be using Clarity Node-S stationary air quality monitors. Clarity leverages expertise in air sensing technology, IoT devices, and data analytics to provide cloud data services and access from their systems. Founded in 2014, now deployed next- generation, highly-accurate indicative air quality monitoring networks in more than 60 countries around the world — empowering clients to build healthier communities with better data.

We have also assembled a Technical Advisory Committee to advise and guide the project:

- James McGrath - *Open Space and Natural Resource Program Manager, City of Pittsfield,* jmcgrath@cityofpittsfield.org
- Sean Wihera - *Clarity Movement,* sean@clarity.io
- Gonzalo Bermudez - *Spanish translator with Manos Unidas,* 413-854-1060
- Andy Cambi - *Director of Public Health, City of Pittsfield,* acambi@cityofpittsfield.org
- Dr. Henry Rose, MD - *Nephrologist (retired),* rosehenryj@gmail.com
- Chester Halek, fishingpole1954@gmail.com, *Energy sector worker (retired) with experience in 21 H testing, repairing and maintaining sampling and testing equipment, working with state (DEP) and federal authorities and conducting environmental classes for local colleges.*

Most relationships with this set of project partners have already been ongoing for years. It is our expectation that this project will help deepen and broaden the ties of all of our organizations to our community members by improving quality of life through improved environmental surroundings, better housing, and access to clean energy options for home and transportation.

Our local partners are all organizations who are dealing directly with the most heavily impacted sectors of Pittsfield's populace.

B. Community Engagement
BEAT has strong, on-the-ground ties to these neighborhoods and will be hiring from them for our monitoring staff and project manager. Our monitoring staff will be talking with community members when they are monitoring and at community events to engage people in our work. Data gathered will be made available to the public through a designated website portal that will be widely publicized through organization newsletters, local media and community events. The stationary monitors also provide cloud services for access to the data - "Open Map" service.

Clarity OpenMap
Clarity OpenMap (openmap.clarity.io) is an opt-in platform for adding air pollution measurements to our public repository of open data. Data from Clarity and U.S. EPA reference monitors are displayed in parallel as an easy way to share pollutant data with the public: View, plot, and share data; embed in public websites using iFrame; access seasonal data overlays.

Public Outreach
At Berkshire Environmental Action Team, we regularly work in conjunction with City of Pittsfield officials and intend to share data with them, area boards of health and public health offices, planning commissions, state legislators, and our community partner organizations as well as similar environmental organizations throughout the region.

In the initial months of the project, when the portal is complete and data starting to be gathered, we will notify local, regional and state offices and community advocacy organizations. We'll also conduct interviews about the project and how to access data with local media to reach residents and organizations we may not yet have known or thought to contact. We are also planning outreach through public reporting of project findings at regular intervals, holding multiple community discussions on solutions for air pollution reduction and mitigation during and after the project (in continuance of our ongoing mission of environmental protection and improvement) and a regional symposium on air pollution and solutions near the end of the project. Recordings of these events available through our YouTube channel and on local public television. We also plan to help guide anyone who wishes to better understand the project through private consultations.

B. Community-Based Organization Set-Aside
Since its inception in 2003, Berkshire Environmental Action Team has been a grassroots organization of Berkshire County residents, starting with protecting the environment in Pittsfield, Massachusetts. Over the nearly 20 years since, BEAT has partnered with many organizations, worked with local leaders and state agencies, and reached out directly to the community at cultural events, farmer's markets, and door to door campaigns. We have also become the community's go to organization for reporting possible environmental violations including air quality permit violations. They trust BEAT to ensure appropriate action is taken.
See BEAT's Community Organization Statement in Attachments

BEAT's extensive pre-COVID in-person interactions with community members consisted of attending meetings of community organizations, offering public presentations, appearances and tabling at community events and holding our own events and workshops. As COVID hit, we adapted by attending meetings online, and in participation in the Mass Save Community Partnership program we found creative ways to reach the public via social media, appearances and presentations on local broadcast media, sharing program information through community organization newsletters, no-contact flyering to individual homes and community aid locations.

Berkshire Environmental Action Team has since been asked by multiple state regulatory agencies and oversight committees such as the Department of Environmental Protection, the Energy Efficiency Advisory Committee Environmental Justice Table and the Climate Assessment Committee, to consult on community outreach methods and to provide key contacts to these state entities because of our long history of direct work with community members.

Section 3 – Environmental Justice and Underserved Communities

Pittsfield is a designated "Gateway" community[2], struggling with economic opportunity and PCB contamination, since the departure of General Electric as a major employer in the 1980s. Pittsfield's rate home rental vs. ownership is 38.2% (utilities NOT included in rent for 80% of units, adding to the financial burden of renters)[3], limiting control over state of repair, indoor air quality and protection from outdoor pollution for a large number of residents.

Pittsfield demographics

"Pittsfield is the largest of the two cities in Berkshire County at the far western end of Massachusetts with a population in 2020 of almost 44,000 people. The city is 86.8% White, 6.8% Hispanic or Latino, 4.5% Black or African American, 2% Asian, and 4.2% two or more races. The median income is $51,411; significantly lower than the statewide median income of $81,215. And the Pittsfield poverty rate of 13.4% is significantly higher than the statewide rate of 9.4%. The percent of people under 65 with a disability is also significantly higher at 14.8% than the state average of 7.8%." [4]

The most densely populated neighborhoods of Pittsfield, Morningside and West Side, are also it's largest Environmental Justice neighborhoods, so designated by the state for minority and low income status[5]. West Side is a particularly hard hit neighborhood, with a median income of $18,600, and with 76.7% of residents with a high school diploma or less. Pittsfield is also ranked 3rd in the nation for oldest housing stock - median age 60 years[6] - creating health concerns from poor indoor air quality and poor protection from outdoor air pollutants. Housing conditions are particularly stark in West Side, a neighborhood with a history of red-lining[7]. It's also home to many abandoned properties and those owned by absentee landlords.

The West Side and Morningside EJ neighborhoods are also shown on the EPA EJ Screen[8] mapping system to rank:

— 50-70th national percentile for air toxics cancer risk;
— 50-80th for particulate matter, ozone and hazardous waste proximity;
— up to 100th national percentile for traffic proximity, Superfund proximity and lead paint

See Pittsfield Map & Facts Sheet in attachments for a more detailed profile of Pittsfield and its Environmental Justice Neighborhoods

Covid-19 Impacts

Pittsfield's daily case rate hit its highest peak of 283 cases per 100,000 on January 16, 2022, with an estimated actively contagious case count of 790 on January 15, 2022. Confirmed COID-19 cases in Pittsfield to date comes in at 10,233. That's 23.29% of Pittsfield's 43,927 residents[9].

Berkshire County in general is frequently discounted or misunderstood by decision makers in the state's capitol at the opposite edge of the state, as evidenced by - among other things - Berkshire

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[2] **Massachusetts gateway cities** are "midsize urban centers that anchor regional economies around the state," facing "stubborn social and economic challenges" while retaining "many assets with unrealized potential."

[3] https://www.towncharts.com/Massachusetts/Housing/Pittsfield-city-MA-Housing-data.html

[4] https://www.census.gov/quickfacts/fact/table/pittsfieldcitymassachusetts/INC110219

[5] https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212

[6] https://eyeonhousing.org/2018/09/25123/

[7] Redlining Study https://drive.google.com/file/d/16ZDpn6yWvzYhv0I_VAmA1hvE-8UCn6K5/view?usp=sharing

[8] https://ejscreen.epa.gov/mapper/

[9] City of Pittsfield COVID-19 Community Impact Dashboard.
https://pittsfield.maps.arcgis.com/apps/dashboards/2403253402548bd82559fc577e35ba3

County recently having had all of its COVID testing sites slated to be closed.[10] Though the COVID-19 pandemic has made state hearings and proceedings more accessible through use of Zoom, state outreach to grassroots community organizations is in early stages in Massachusetts.

Access to sufficient internet bandwidth was proven to be an obstacle during the height of the pandemic, as children attempted to attend school remotely. Some basic provisions were made to expand access, but these were limited and it still remains out of reach for many LMI households.

Community organizations in Pittsfield such as our partners and others are working on bridging the gaps in access to social support networks for equitable access to food, healthcare, adequate housing and economic opportunity. Data from this project will help inform and bolster these groups in their petitions for aid and policy reform.

Section 4 – Environmental Results—Outcomes, Outputs and Performance Measures

A. Expected Project Outputs and Outcomes

Expected outputs from the project include, but are not limited to:

- Identification of air pollution - PM2.5, PM10, NO2;
- Community-specific assessments of air pollution data, including neighborhood-specific results;
- Deployment of equipment to conduct air quality monitoring in or near underserved communities;
- Increased public awareness of air quality and use of citizen science through demonstration of hand-held monitoring at public events in the community;
- Near real-time air quality data availability for communities and other stakeholders;
- Strengthening of existing and promotion of new partnerships and community involvement through various activities and information exchanges;
- Data-informed advocacy for better public health, housing, transportation and land use reform

With specific, neighborhood-level data, we can more effectively advocate for these e***xpected outcomes:***

- increased participation by local business and industry in emissions reduction, demand response programs and adoption of renewables to lower emissions
- changes in traffic patterns and electrification of public transit and school buses
- energy efficiency upgrades & electrification of buildings and vehicles to reduce emissions
- improved conditions in housing and public buildings, allowing for improved health outcomes
- no fossil-fueled or trash burning electric generation within the city
- increased access to clinics and healthcare measures
- improved access to green space

B. Performance Measures and Plan

BEAT will be using data collection and cloud services from Clarity Movement, Co. for handling of data from the stationary monitors. We will also be using data management software provided by AeroQual for the incoming data from the mobile monitors. The means of gathering and

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[10] https://www.wamc.org/news/2022-03-10/berkshire-legislators-fuming-over-baker-administrations-move-to-close-countys-state-run-covid-19-test-sites

tracking responses to our health conditions survey will be developed with public health officials, physicians and public health education faculty.

We will track how many outreach events we participate in and how many individuals we speak with. We will also track any new partnerships that may develop from this project.

Data gathered will help us advocate for specific emissions reductions, e.g. changing our school bus fleet to electric buses. Data will be made publicly available on a dedicated monitoring website, through local community groups, government offices and public media outreach described in the local outreach plan listed in section 2 B of this application.

Measurable short term and longer term results the project will achieve

Short-term:

- a publicly available and accessible database of emissions, traceable in real time as well as archived for future reference
- participation of residents in observing emissions monitoring
- a body of analysis of how these emissions fluctuate in different seasonal & weather conditions

Longer term:

- use of data to inform changes to policies in energy generation, energy use, energy efficiency and demand reduction, transportation patterns and fuel sources, public health services
- public education in the importance of community monitoring for improving lives
- changes in legislation and public policy to lower emissions, improve access to and effectiveness of public health and improved housing conditions

C. Timeline and Milestones

Nov. 2022:	Hiring of project manager
Nov. - Dec. 2022:	Bidding, procurement, installation of stationary air monitors;
	Bidding & procurement of hand-held monitors
	Hiring of mobile monitoring staff
Nov. 2022 - Mar. 2023:	Drafting of community health survey
Dec. 2022 - Jan. 2023:	Creation and launch of public online portal
	Announcement of project and availability of data to local and regional government offices and community organization through direct invitation and press and media outreach.
Jan. 2023:	Training and initial deployment of mobile monitoring staff.
Apr. 2023:	Outreach to and enrollment of health survey participants
Sep. 2025:	Proposed cessation of data collection for this project *(may continue)*
Jun. - Nov. 2025:	Preparation of final analysis and report
Nov. 2025:	Regional symposium on project findings, identified plans of action
Ongoing:	Live mobile testing demonstrations at community events
	Community discussions on solutions for curbing sources and mitigating effects of air pollution
	Semi-annual reports to local and regional departments
	Public reporting of progress and trends
	Educational outreach to community & environmental groups

Section 5 – Quality Assurance Statement

BEAT's Executive Director will be in charge overall of Quality Assurance, working with our

Technical Advisory Committee, and will develop a written QAPP, Statement of Work, and project procedures document. She has a master's degree in zoology and 15 years of experience with Quality Control in environmental sampling and has had QAPPs approved by the Massachusetts Department of Environmental Protection for water quality monitoring. The project manager and staff will be trained to oversee the day-to-day monitoring and data collection. The Project Manager will review all data collected by staff. All collected data will be quality-checked by the Director as well.

Data from the Node-S air quality monitors are uploaded via 3G/4G LTE to the Clarity Cloud. Pollutant data is accessed via the Clarity Dashboard and Clarity OpenMap web apps, or measurements and sensor data can be retrieved using Clarity's REST API. Clarity's Remote Calibration technique has been designed to meet USEPA and European Union standards for assessing air sensor performance. Remote Calibration ensures that the calibrated data from the project's Clarity network meets the target values specified by USEPA and EU standards. ***See attachment "Clarity Movement QA Plan"***

Section 6 – Programmatic Capability and Past Performance
A. Past Performance

1. MassSave Community Partnership grant - BEAT contracted with the City of Pittsfield - our contact: Nate Joyner, njoyner@cityofpittsfield.org 413-448-9673. Despite the onset of the pandemic, we were able to come close to meeting all the goals and were awarded 91% of the possible $15,000. The 91% award was due to the MassSave program administrators' policy of only counting shortfalls and not overages of specific goal categories. We actually achieved 119.9% of the overall program goals.

2. Greening the Gateway Cities reimbursement grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) - BEAT worked in partnership with the City of Pittsfield and the Department of Conservation and Recreation for 4 years on this program, and for a fifth year with Downtown Pittsfield Inc. as an additional partner. Together we reached out to people in the Environmental Justice neighborhoods of Pittsfield to offer free professionally planted trees. Additionally, BEAT helped care for young trees planted on public housing area property. Over 3,000 trees were planted (our original goal was 2,800), mostly on private property, to reduce energy use, produce better health outcomes, and beautify these neighborhoods. Our contacts at EEA are no longer working there, but in the City of Pittsfield we worked closely with James McGrath, Park, Open Space and Natural Resource Program Manager, jmcgrath@cityofpittsfield.org 413-499-9344.

3. Massachusetts Environmental Trust (funded by the sale of environmental license plates) funded stormwater outfall pipe surveys and *E. coli* testing of stormwater outfalls with flow after a period of no rain for 72 hours. BEAT surveyed and mapped 764 outfalls in the communities of Pittsfield, Dalton, Cheshire, Adams, and Lanesborough. Funding allowed for the sampling of 20 that exhibited dry weather flow. One exhibited very high *E. coli* readings. The city found an illicit sewer connection (toilet hooked to storm sewer). Owner forced to take action. Issue resolved. Kate McDermott, MET Program Coordinator kathleen.mcdermott@mass.gov

B. Reporting Requirements
We were fully compliant and timely on reporting progress and final outcomes for all previous agreements listed above. MassSave was a performance based grant. Greening the Gateway

Cities was a reimbursement grant with monthly reporting. MET had been ¼ upfront, ½ upon satisfactory mid-term report, and ¼ upon final report; but recently changed to reimbursement.

C. Staff Expertise

— **Jane Winn,** *Executive Director, Berkshire Environmental Action Team*
Jane has a Master's Degree in Zoology and experience with quality control and execution of environmental sampling for the last 15 years. She also has a long history of interacting with the EPA on Housatonic River cleanup of PCBs left by General Electric.

— **Rosemary Wessel,** *Program Director, Berkshire Environmental Action Team*
Rosemary's background in marketing and education has been serving Berkshire Environmental Action Team's public outreach, education and community coalition-building work for the last eight years. She has made and maintained a wide network of community and advocacy organizations to partner with BEAT on multiple environmental fronts.

— Project manager and staff to be hired. ***See resumes and "Job Descriptions" in Attachments.***

Section 7 – Budget

A. Budget Detail

Line Item and Itemized Cost	Requested from EPA	Cost Share provided	Total
PERSONNEL (includes tax and fringe)			
(1) Project Manager @ $45,000 annual, full time, x 3 years (new hire to manage this program. Includes 20% for tax & fringe)	135,000		135,000
(4) Project Staff @ $17.50/hr., 20 hrs./month x 2.75 years + 16% for tax & fringe (community members hired to gather mobile air quality data)	55,000		55,000
Project Supervisor $10,000/yr x 3 years (25% of Project Supervisor's time)	30,000		30,000
Executive Director - Project Grant accounting, quality control, and management $5,000/yr x 3 years (average 12 hrs/mo including tax and fringe)	15,000		15,000
TOTAL PERSONNEL	**235,000**	**0**	**235,000**
TRAVEL			
Travel for Project Manager 12 mi. per wk @ $0.585 mi. x 156 weeks	1,095		1,095
Travel for 4 staff 6 mi per wk @ $0.585 mi. x 156 weeks	2,190		2,190
TOTAL TRAVEL	**3,285**	**0**	**3,285**
EQUIPMENT			
10 continuous monitors for PM2.5, PM10 and NO2 with support contract @$12,000/yr for 3 yrs (20% discount donated by supplier)	29,721	7,200	36,921
5 AeroQual hand held base monitors w/ PPM monitor heads	5,500		5,500
TOTAL EQUIPMENT	**35,221**	**7,200**	**42,421**
SUPPLIES			

Office supplies for printing & copying	500		500
Program supplies - safety vests, clip boards, traffic cones	125	125	250
Laptop & software	2,500		2,500
TOTAL SUPPLIES	**3,125**	**125**	**3,250**
VOLUNTEER TIME			
Volunteers 25 individuals, average of 5 hrs/yr - 125 hrs x 3 yrs = 375 hrs @ 28.54 Independent Sector value of volunteer time		9,578	
5 Technical advisory committee average 3 hrs/ys x 3 yrs @$40/hr		1,800	
TOTAL VOLUNTEER TIME	**0**	**11,378**	**11,378**
INDIRECT COST (de minimis 10% of personnel cost)	**23,500**	**0**	**23,500**
TOTAL PROJECT COST	**300,131**	**18,703**	**318,834**
TOTAL BUDGET SUMMARY			
PERSONNEL	235,000	0	235,000
TRAVEL	3,285	0	3,285
EQUIPMENT	35,221	7,200	42,421
SUPPLIES	3,125	125	3,250
VOLUNTEER	0	11,378	11,378
INDIRECT COST (de minimis 10% of personnel)	23,500	0	23,500
TOTAL PROJECT COST	**300,131**	**18,703**	**318,834**

B. Reasonableness of Costs

Personnel - Employer's share of taxes & fringe has averaged 16% for the last several years. BEAT pays the full cost of the MA Family Medical Leave tax. BEAT currently provides a reimbursement for permanent, full-time employees use of their cell phones and lap tops for BEAT business. BEAT provides 3 weeks paid vacation and unlimited sick time for when staff are sick, as well as very flexible hours.

- Project Manager (new hire for 3 yr period) - 1 FTE - $45,000 - 100% of time
- 4 Project Staff (hire from community) - 20 hrs/month @$17.50/hr plus 16% employers share of taxes
- Project Supervisor, Rosemary Wessel - 0.6 FTE - $42,000 - 25% of time
- Executive Director, Jane Winn - 1 FTE - $50,000 - 10% of time

Travel - distance is our best estimate of travel distances around Pittsfield to do the handheld monitoring and to check on stationary monitors. Staff will be using their own vehicles and reimburse at the federal standard mileage rate of $0.585 per mile.

Equipment -

• 10 continuous monitors for PM2.5, PM10 and NO2 with support contract @$12,000/yr for 3 yrs (20% discount donated by supplier) (*see brochure in attachments*) - These very high-quality stationary monitors will give us data to compare locations in the environmental justice neighborhoods with two control sites. In consultation with Clarity, we decided that 10 monitors will give us good coverage of the city. This will allow us the data to potentially show where air pollution needs to be addressed most urgently and by the locations and timing of the pollution, we hope to be able to have a strong indication of the source of the pollution.

• 5 AeroQual hand held base monitors w/ PPM monitor heads *(see brochure in attachments)* - These hand held monitors will allow us to involve hired community members in looking for specific sources of air pollution and also allow us to show community members attending events exactly what we are doing. We are buying one extra monitor for two reasons - one, to have an extra if one needs repair so we do not have down time. And also to take to community events even if the other monitors are in use. This will engage our community in the work we are doing.

Supplies -
• Office supplies for replacement ink cartridges and copy paper for flyers, posters, and other handouts to educate our community about this project.
• Program supplies - safety vests, traffic cones, clip boards for staff using hand held monitors
• Laptop and software for Project Manager - this will be a new, 3-year hire from the community.
• We will provide a laptop and software that will remain with BEAT after the 3-year period to continue our air quality monitoring program.

Volunteers -
BEAT usually (pre-pandemic) has about 300 individuals who volunteer for us throughout all our programs every year putting in over 1,000 hours of work. With this project, we want to involve new volunteers from the environmental justice neighborhoods whom we may not have reached with our other programming on wetlands, waterways, and wildlife. We use the Independent Sector Value of Volunteer Time for our rate.

We have asked technical specialists to volunteer to help us with data interpretation, survey development, and overall technical support and advice. We have estimated an overall rate that we feel is very low, but we did not want to over-estimate.

C. Expenditure of Awarded Funds
BEAT will immediately order the equipment and hire the project manager. Once the project manager is hired and trained, we will hire staff for community monitoring. We use a payroll service for paying all staff. Our staff monitors will have their hours confirmed by the Project Manager, before being submitted to the Executive Director who is in charge of submitting to the payroll service. We have an outside bookkeeper who comes in monthly to review all income and expenses by fund account and reconcile all accounts with our bank statement.

BEAT has a history of completing grant-funded projects on time and on budget.
Also - See Timeline and Milestones in Section 4 C above.

Section 6 – Optional Attachments.

See partnership letters, personnel resumes, BEAT's community organization statement, job descriptions, equipment invoices and spec sheets, and community information in attachments.